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AMERICAN JOURNAL OF OPHTHALMOLOGY

Vol. I APRIL, 1918 No. 4

AN EXPERIENCE THROUGH THE HALIFAX DISASTER.

CAPT. FRED TOOKE, M. D., C. A. M. C.

MONTREAL, CANADA.

This paper, partly outside the usual lines of ophthalmic literature, gives the general aspects of a unique ocular catastrophe as seen by a colleague. It also gives the broad impressions gathered from a large number of casses, and about the effects of certain lines of treatment for such injuries.

The recent catastrophe at Halifax has apparently come and gone. Passed, perhaps to many at a distance whose near point is always fixed in relation to their preoccupation with the affairs of the moment and within their own very limited range of vision; an event never to be forgotten in Life's experience on the part of those whose fortune drew them to the help of that unhappy city.

Call the event an accident, a blunder, the part of an organized plan, define it as you will, it must still remain a tragedy of the war and be particularly considered as such as any event that has happened in France or in Flanders. Far be it from me to dare to assume the role of an arm chair critic at such a distance regarding what is happening overseas. I have, however, seen Halifax and I do happen to know what has happened there. A well known officer of one of Canada's most brilliant battalions, enjoying the distinction of a Master of Arts degree as well as a Distinguished Service Order decoration with bar, a scholar no less than a soldier, told me on driving me home to my billets one night after work, "the war has nothing on this, and I have seen the worst of it."

Be it an act of war in our own country, or approach it from any angle that may suit your own personal idea or opinion, however ridiculous or however improbable, I wish to state at the outset that I am glad that I was there. More than that, I would acknowledge with deep gratitude the privilege and the unusual opportunity accorded me, probably that of a lifetime, of helping suffering humanity; an occasion which might equally well have fallen to another and a duty that might have been fulfilled by another with more brilliant results if not by greater zeal and honesty of purpose.

The occasion could not have been staged with greater tragedy: the horror of its results could not possibly have appealed to anything other than what we are pleased to term our better selves. The whole affair was in many respects a revelation with respect to our regard for human nature.

A record of the events of any human experience, however satisfactory or however satisfying, is seldom published without being weighed down by an if or a but. Our recent adventure is no exception to such a general rule. My only regret is that our call for help from Halifax was not made more immediate and that we could not have arrived on the scene twelve or eighteen hours earlier. It would appear that the delay was unavoidable for very obvious reasons.

On December 8th, I was ordered by Lt. Col. Patch, A. D. M. S., Military District No. 4, to proceed at once to Halifax and report for duty to Lt. Col.

F. McKelvey Bell, A. D. M. S., Military District No. 6. My only instructions were that with the recent explosion an unusual number of eye casualties had occurred and that an eye surgeon was urgently needed. I left by the first train available, taking a complete set of eye instruments. Thru the courtesy and thoughtfulness of the authorities of the Royal Victoria Hospital who had heard of the order, Miss Etter of the nursing staff of the Ross Pavilion was detailed to accompany me for special duty. The trip to Halifax was uneventful but for its discomfort. We started out in a blizzard; much delay was experienced the first night driving against snow drifts. The following morning when connecting with the commissariat department at about ten o'clock, five hours late, we were put on very much reduced rations. Only two rather meagre meals were served by the dining car. Later on as the day grew dark, the electric light installation went out of order, a dim and almost inconspicuous light flaring up brightly only every few revolutions of the wheels. As we were dependent upon two candles during the intervening space of time the effect on the eyes was the same as frequently testing pupillary reaction and the result was headache. Our delay of six hours was in many ways an unmixed blessing for we were able to get a second rather comfortable night on the train rather than the anticipation of looking up billets in the early hours of the morning in a strange and devastated city.

We arrived at our destination on Monday morning at half past six o'clock. The day was dark and cold and the details of the city could scarcely be made out. The roof of the Canadian Government Railway Station had fallen in, innumerable cars and trucks were wrecked on the sidings, and we were compelled to make our way through a sea of broken glass and over countless obstacles, chiefly wreckage and coffins. One could not begin to count the latter. The sense of depression was almost unbearable. Not a sound could be heard, railway trains were not running, ours had only been the second to arrive in Halifax, electric cars had been suspended, one could not even hear a motor horn. The streets seemed to be empty. The silence was intolerable and Halifax at first impression seemed to be in fact a city of the dead. We reported to Military Headquarters when I was assigned for duty at Camp Hill Military Hospital, taking Miss Etter with me.

A word of digression, however, regarding the source of the accident, its nature, and some of its effects. Probably a great deal of what I relate to you has already been furnished by the public press. Much detail might be supplied by many regarding the problematic nature of the explosion which I discreetly feel it better to avoid. In brief, the ammunition ship "Mont Blanc," laden with tri-nitro-toluol in the hold and with benzol in tanks on the deck, was rammed by the Belgian Relief steamer "Imo." With the collision the benzol ignited, and the "Mont Blanc" was soon ablaze. A call was rung in for the Halifax Fire Department. The peculiar glare from the light as well as the ringing of the fire alarms attracted everybody to the windows, principally women and children. An attempt was made to scuttle the burning ship but without avail. In less than half an hour's time a terriffic explosion occurred as the result of the benzol and the tri-nitro-toluol coming together. One must visit Halifax and view its ghastly scars in order to estimate the awful result. An area one and a half miles square was laid flat, not a dwelling left intact, large trees were shattered. There was not one building in the whole of Halifax without broken glass. The home of the late Lt. Governor McKeen where I had the good fortune to be billeted, three and a half miles from the source of the accident, had more broken windows than one could count. A fortunate circumstance in many cases, as in this, was that the double windows had not been put up for the winter.

A few curious freaks showing the frightful force of the explosion. The anchor of the "Mont Blanc," weighing six tons, was discovered in one of the

dismantled Exhibition buildings three miles away. The ship's 4.3 gun was found a mile away over on the Dartmouth side. Many bodies were found with their clothing literally torn off them without their necessarily having been burned; while one man was carried through the air for a distance of a quarter of a mile and landed on terra firma, his only misfortune apparently being that a keg of nails had been predestined for his point of alighting. Verily the days of "Munchausen" are still with us. This statement, however, I can vouch for as the man gave evidence before the Naval Court of Enquiry the day before I left Halifax.

But to return to my special mission and my own experiences. I reported to Major Morris, Officer Commanding Camp Hill Hospital, the largest unit in action during the emergency. Camp Hill is a hospital designed, equipped, and intended in Halifax as others are contemplated in other divisions, for returned men who have been invalided home. The estimated capacity of Camp Hill was 280 beds, plus the sun parlors. By a fortunate coincidence there was a complete complement of medical officers, staff, and orderlies. Captain John Fraser, A. M. C., was also in Halifax with 200 reinforcements for the Army Medical Corps waiting for transportation overseas. Owing to Camp Hill hardly having been in action there were only five nursing sisters on duty, two for relief work and one for night duty. After the crash came, Camp Hill accommodated 1,630 patients. Let it be said to the everlasting credit of the V. A. D.'s that they nobly filled the breach. Also to that of Colonel McKelvey Bell, A. D. M. S., Military District No. 6, for the perfection and thoroughness of his organization. It was wonderful how quickly it was brought into action for such a crisis, and how thoroughly and with what detail the work was carried on. I never saw a large body of men and women work so harmoniously together. Besides the regular workers associated with the A. M. C., there were all sorts of helpers enlisted from all classes of society, making beds, scrubbing the wards, carrying food, feeding the helpless, caring for the children, washing dishes and helping in a hundred and one different ways. Mistress rubbed shoulder with maid and charwoman, all imbued with the same desire to help. All the motors were commandeered and women frequently served as transport officers. Altho at the dawn of a Christmas season one could shudder with the thought of "Peace on Earth," one was inspired and encouraged with the doctrine of "Goodwill Towards Men."

Many of the wounded died the day they were admitted to hospital for this reason. After the explosion it was quite impossible to prevent terror and panic on the part of the mob and the rumor spread that the fire was making headway towards the arsenal at Wellington Barracks. A still more serious explosion was anticipated, and the poor people fled to the parks, woods and open places, away from the center of the city, scantily clad, with their ghastly wounds unattended. Here they were overtaken by a terrible blizzard and rescued by stretcher bearers in a half frozen and almost exsanguinated condition. The mortality was in consequence at first terribly high, largely the result of exposure, exhaustion and loss of blood, a circumstance for which nobody could be held directly responsible.

Every available bit of space at Camp Hill was taken up. Men, women, and children were at first all collected in the same ward irrespective of their condition. Frequently three would occupy the same bed. Patients were even under the beds and between the beds lying on blankets, as well as in the corridors. One made one's way thru the wards with the greatest difficulty. The day of my arrival the numbers were reduced to 900 and I would pay this tribute to Major Morris by saying that the hospital was carrying on in excellent order. The windows had all been repaired, each patient had a bed or mattress with warm clothing, while an abundance of good, nourishing food was served alike to patients and staff.

I was taken to a small back room lighted by a single electric globe. Here

a man was operating who was introduced to me as Doctor Cox of New Glasgow, N. S. I pay my tribute to this small town specialist, as well as to Doctor Putnam of Yarmouth, N. S., who later came to my assistance. The first mentioned bore the brunt of the first shock of the service. He left his work at home at a moment's notice and traveled one hundred miles to Halifax. He was left four miles out of the city groping about in darkness, frequently stumbling over dead bodies, before he was able to reach the center of the city. He at once put in a twenty-four hour continuous service and after a three hour rest had started again when I discovered him. Most of the night he had been working in the kitchen and operating on the floor. Doctor Cox from his appearance might have been anywhere from 40 to 65 years of age, such was the result of fatigue in his expression and behavior. He was manifestly exhausted and he told me that he had done so much work that his instruments would no longer cut. I sent him off to bed and proceeded to take over the service and sort out the material. There were about 120 people in one ward, practically all major operation cases. For this service I had two other oculists associated with me besides Doctor Cox to whom I have already referred. Doctor Cox left for his home the day after my arrival, one member of the staff developed a severe gastric disturbance due to overwork, while the third acquired a paronychia.

Left practically alone I consequently proceeded to form a "Union Government." Doctor Ames a general practitioner of Westville, Me., acted as surgical dresser; Mr. Haslam, a fifth-year medical student, gave more chloroform and gave it better than I have ever seen it given before. Sergt. Wallace, a returned Army Service Corps man, whose like I have yet to find for honesty, energy and ability, acted as my orderly, while Miss Etter and I completed the team. From this time on operations were undertaken somewhat more cautiously, due to the fact that the most urgent had already been performed.

Let us make a very brief survey of some of the cases in one ward under my care. Anything like complete note taking was quite out of the question. We were working under such pressure that it was impossible to dilate on a very few sketchy notes, without feeling that the more important fact of treating the patients was being overlooked. Sergeant Wallace, who was always at my heel with pad and pencil, managed to collect these few facts for me which afford one a fair average of the hundreds of such cases in the Hospitals of Halifax.

1. W. A. G. Right eye uninjured. Left eye, two long perforated wounds of the cornea, iris prolapsed. Iridectomy and edges of iris freed.

2. Unknown child. Wound of lid with marked induration of tissues. Examination under chloroform, eye uninjured.

3. Mrs. M. A. Both eyes and appurtenances torn to shreds. Remains enucleated, double dressing to orbits, multiple glass wounds of face and neck.

4. M. C. Child about 3 years. Laceration of left upper lid. Left eye completely destroyed. Lid sutured and remains of eye enucleated.

5. G. A. M. Laceration of lids of right eye, globe normal. Left eye perforated wounds of cornea. Iridectomy and lids sutured. Glass wounds in neck.

6. J. K. Left eye completely collapsed, enucleated. Right eye perforated wounds of the cornea, prolapsed iris, iridectomy.

7. Mrs. R. B. Multiple wounds of left cornea below at temporal side near ciliary margin. Presenting iris excised and flap of conjunctiva sutured over wound.

8. R. F. Multiple glass wounds of both lids. Dressed.

9. J. C. Abrasions of both corneae. Dressed.

10. J. B. Complete destruction of both eyeballs, large fragments of glass removed from globes after enucleation.

11. Mrs. G. R. Multiple incisions of both lids. Dressed.

12. G. B. Right eye normal. Perforated wound of left sclera up and out. Sutured conjunctiva over wound and applied double dressing for a few days.

13. R. S. Right eye normal. Perforated wound of left cornea. Iridectomy, argyrol, atropin and bandage.

14. G. H. Slight abrasions of right cornea. Condition not serious.

15. A. L. Right eye normal, left eye collapsed, enucleated remains.

16. Mrs. T. A. E. Superficial abrasions of right cornea. Perforated wound of left sclera with prolapse of ciliary body. Excised prolapse and sutured conjunctiva over wound. Atropin, argyrol and double bandage. To be treated conservatively pro tem.

17. Mrs. D. McK. Left eye abrasions of cornea. Perforated wound of right cornea with prolapse of iris. Iridectomy, atropin, argyrol and bandage.

18. F. McK. Left eye normal. Perforated wound of right cornea. Prolapse of iris. Iridectomy, atropin, argyrol and bandage.

10. Mrs. A. D. Left eye normal. Long perforating wound of cornea extending into sclera and ciliary body. Two other perforating wounds of sclera. Eye enucleated.

20. E. B. Right eye normal. Multiple wounds of cornea. Anterior chamber completely filled with blood. Treat conservatively for a few days.

21. W. H. Left eye normal. Perforating wound of right cornea with prolapse of iris. Iridectomy, atropin and bandage.

22. Mrs. G. A. M. Left eye normal. Right eye completely destroyed. Enucleated remains of right eye and sutured lid.

23. Mrs. A. B. Right eye normal. Half inch perforation of left sclera from corneal margin backward, globe collapsed. Enucleated.

24. Mrs. S. R. Right eye completely destroyed; enucleated; large corneal wound of left eye extending into ciliary body above., Conjunctival flap atropin, argyrol and bandage.

25. A. S. Right eye normal. Extensive perforating wound of left cornea with prolapse of iris. Iridectomy, atropin, argyrol and bandage.

26. Mrs. C. S. Right eye normal, left eye completely destroyed. Enucleated remains.

27. T. N. Left eye normal. Oblique wound of left sclera over ciliary body, ciliary body and vitreous presenting. Enucleated.

28. M. B. V-shaped ragged wound of left cornea extending into the conjunctiva below. No apparent inclusion of iris or ciliary body. Atropin and bandage both eyes.

29. J. McM. Left eye normal. Perforating wound of left cornea at limbus. Iris incarcerated. Iridectomy. Soft lens matter to be evacuated later. Double bandage.

30. A. S. Right eye normal. Perforated wound of left cornea at limbus. Iris incarcerated. Iridectomy. Soft lens matter to be evacuated later.

31. F. S. Extensive necrotic wounds of lids and right side of face. Neither eye injured. Moist dressings to lids and face.

32. Mrs. P. Wound of right cornea extending 2mm. inward to nasal side towards ciliary body. Iridectomy, atropin, and double bandage.

33. Mrs. H. McN. Wound of right cornea at limbus. Iridectomy. Edges freed, atropin and bandage.

34. Mrs. S. R. Perforating wound of left cornea with prolapse of iris. Iridectomy. Right eye has already been enucleated.

35. F. B. Perforating wound of right cornea from limbus to center of pupillary area. Iris incarcerated and fixed about pupil. Iris freed and iridectomy done.

36. Mrs. A. S. Ragged tear of right cornea above in vertical line. Inclusion of ciliary body and vitreous in wound. Treat conservatively. Perforated wound of left cornea below with presentation of iris covered by conjunctiva. Traumatic cataract. Atropin and double bandage.

37. Mrs. R. P. P. Small linear incision made over left lacrimal bone for

escape of particle of glass. Moist dressing.

38. Mrs. M. V-shaped wound of cornea with deposit of lymph about edges. Hyphema. Iris cannot be detected. Edges of wound freed, atropin and bandage.

39. M. D. Opening of conjunctiva over insertion of external rectus muscle for escape of glass particle.

40. L. D. Large perforating wound of right ciliary body above. Globe enucleated.

41. W. A. R. Right eye normal. Large corneo-scleral wound of left eye with prolapse of ciliary body. Enucleation of eye ball.

42. Mrs. W. Left eye completely destroyed. Extensive penetrating necrotic wound of lid. Oil silk inserted in orbit to prevent adhesions of lid to conjunctiva.

43. M. L. Perforated wound of right sclera at temporal side. Incarceration of ciliary body, excised. Perforated wound of left cornea, prolapse of iris, wound granulating over, traumatic cataract. Atropin and double bandage.

44. Mrs. G. N. Right eye collapsed, panophthalmitis. Necrosis of tissues with edema of lids. Enucleated, moist dressing.

45. Mrs. S. Both eyes so destroyed that organs cannot be distinguished. Extensive wounds of face and lids. Moist dressings.

46. A. P. Right eye normal. Perforating wound of left cornea 4 mm. in length opening horizontally toward nasal side of corneo-scleral margin. Iridectomy.

47. M. S. Right eye collapsed, enucleated. Left eye shows multiple incised wounds of cornea extending from center of pupillary area to corneal limbus below. Wound gaping and vitreous presenting. Vitreous excised. Conjunctival flap and bandage.

48. B. C. Vertical incised wound of right cornea. Extends several mm. below the corneo-scleral margin. Wound has already been sutured and is apparently in a healthy condition. Cornea edematous at temporal side. Atropin and bandage.

We had some exceedingly difficult enucleations where the lids had to be separated by retractors, so intense was the induration, with the attendant necrosis of the conjunctiva. Secondary adhesions rendered our progress slow but in no case did we meet with any untoward complications while operating. In one or two cases I practised the Lister operation, separating the muscles and eviscerating the contents of the globe, at the same time excising most of the sclera and leaving only a small curtain of this tissue about the optic nerve. The idea of this procedure is presumably to offset infection backwards into the orbit. The reaction in these cases seemed to be much greater than in the simple enucleations where drainage forward, in my opinion, was better.

It must be remembered that the eye injury was frequently only an associated condition of the most ghastly incised wounds of the head, face and neck. These wounds were invariably caused by glass and could only be described as hideous; they were all too terrible. Much of our time was consequently taken up by attending to these wounds, the fact of dressing the eye being a mere coincidence. Practically every face wound was septic; nay more, each was welling out with copious purulent discharge while other wounds appeared almost to be gangrenous. An earlier attempt had too often been made to bring the edges of these tears together by sutures, the stitches invariably sloughing out at one side, leaving the adjacent tissue more necrotic. The faces appeared as though some filthy septic claw or rake had been dragged over the face as deeply as it could penetrate. In cases of retained glass a bloody serum kept being exuded rather than pus, this no doubt being due to the irritation caused by the retained glass. In many cases it was marvelous how intense had been the injury inflicted upon one lid while the underlying eyeball had not been disturbed. On the other hand it was equally to be

wondered at how often an eye was picked out by glass while the lid remained uninjured.

One case of the class I have just referred to gave us a great deal of anxiety for a time. The right eye had been enucleated and the left cornea severely injured. There were multiple deep incisions above the right brow and over the right temporal region. These had become septic, although there was no reaction in the orbit following the operation for removal of the eye. On about the fourth day following operation, the patient's general condition being bad, there were severe hemorrhages from four points of the temporal artery. This condition was no doubt brought about by the septic condition of the patient as well as by the necrotic state of the tissues about the arterial capillaries. A compress bandage was useless and an anesthetic had to be given when the bleeding points were tied off and a firm bandage applied and left undisturbed for three days. Recovery was uneventful.

A word regarding our treatment of septic wounds of the face. All cases prior to our arrival had been heavily packed, padded and bandaged. We instituted a revolution in this respect by first cleaning the wounds and loosening all scales and scabs which prevented the free escape of pus. Frequently hydrogen peroxid was applied to the wound followed by tr. iodin to the base and edges. The face was then left practically exposed to the air. It was nothing short of marvelous to note how quickly some of these cases cleaned up under open treatment. In a number of cases I used Eusol, more commonly known as Dakin's Solution, on a damaged face after the eye had been enucleated, care always being taken to protect the side of the face with the undamaged or remaining eye. With the attendant and very evident sepsis of the associated parts it was little less than miraculous how few eyes were secondarily infected following intraocular operations. There were numbers of panophthalmitis it is true; but these were primarily so, prior to admission and before treatment of any kind had been instituted. I performed a number of iridectomies, excised portions of presenting ciliary bodies in some desperate cases, and attempted the repair of certain wounds of the cornea with fair success. In only one instance from my own series of cases did infection ensue. The exception was the case of a child who probably tried to remove her bandage. Any attempt at bacteriology would have been a burlesque. We made the best effort at asepsis that was possible under the circumstances. I could vouch for my instruments and dressings through Miss Etter's care. I could not employ rubber gloves as I abominate them in eye work. Perhaps there is a certain unrecorded virtue in the frequent application of "Queen's Laundry Bar" or some of the other commoner kitchen varieties of soap which seemed to come to my hand oftener than any other. Perhaps it was because I used strong bichlorid till my hands began to cut, perhaps it was both; but more probably that because our luck was with us. A word for the conjunctival flap, we made use of it in numbers of cases both in scleral wounds as well as in incised wounds of the cornea, and I do not hesitate to affirm that many of our successes were due to our using this precaution. Argyrol may have helped in certain cases while atropin was used along general lines as conditions warranted. When possible, all intraocular operations were left undisturbed for two days before I did the first dressing.

To show the wonderful reparative results achieved, I am able to state that Camp Hill Hospital was practically evacuated with the exception of about 100 cases in ten days time, the patients generally being transferred to civilian units or to homes organized for their care in some of the smaller neighboring cities of the Province, as Truro, Windsor, New Glasgow, Sydney. We had only 20 remaining in the eye ward who were cases as a rule waiting for their homes to be reestablished in Halifax, or who were expecting accommodation with relatives or with friends.

In Camp Hill Hospital 1,500 Units of antitetanic serum were given to

each patient, but only on the fifth day after the accident, as a large enough supply could not be obtained at first in the emergency. We did not have a single case of tetanus. One case, I believe, did develop at the Victoria General Hospital, but the condition subsided under treatment, the patient unfortunately dying from a lobar pneumonia. I did not see one case of spreading gangrene, although the b. aerogenes capsulatus was noted in four cases in another hospital. We further did not have any cases of erysipelas, although I suspected it in one case, the condition shortly subsiding as a false alarm, much to my peace of mind. There was no meningitis at Camp Hill.

Various reports have been circulated regarding the number of those permanently blinded as the result of the accident. My opinion is that most of these reports have been exaggerated although the number is sufficiently appalling. I estimate that 500 people, or one person in every 150 of the population of Halifax will be or should eventually be wearing an artificial eye. Many will not be able to wear an eye for the reason that there has been irreparable damage done to the lids and face as well as to the orbit. About 200 people will be blind if figures count for anything. I base my figures on the following estimate. The *Halifax Herald* makes the statement that only 3,000 people were injured. If 1,500 were cared for at Camp Hill and if the 8 other units were doing work to full capacity, this number could be easily doubled if one is to include the number of people who were receiving private attention in their own homes or at dressing stations. In my opinion 25 per cent of the casualties were eye cases, making 1,500. Figures compiled from my own wards show permanent blindness in 10 per cent of the cases, which would mean 150 of the total number. This figure will doubtless be augmented to 200 when late manifestations appear in a single remaining injured eye.

There are some questions and problems which will never be answered, or to which history must vouchsafe a reply in the course of time. Were too many eyes removed? I hope not. My time was completely taken up at Camp Hill where I had all that I could attend to. Eye work was done at every other unit or hospital for which I cannot possibly answer. My opinion, from my knowledge of the men entrusted with the work, is that it was conservatively and conscientiously undertaken and carried out. Most of the enucleating at Camp Hill had been performed by my predecessors, Dr. Cox and Dr. McLennan, although a few choice specimens—probably a dozen, complicated cases were left over for my particular edification. From the eyes which I saw remaining and where an honest endeavor had been made at operative repair, I can safely say that no eye was removed at Camp Hill that was not irretrievably lost. One may equally ask the converse, were any injured eyes left where the site of injury might threaten subsequent sympathetic trouble. Where the other eye was injured, no, where both corneae were incised with iris and ciliary bodies presenting, yes. Our hands were absolutely tied under such circumstances. One had no alternative but to trust to a kindly Providence and to hope for the best. The problem which is now confronting the oculists of Halifax is the fate of an eye where a late sympathetic trouble may ensue due to an inclusion of the ciliary body or to the retention of a glass particle in the uveal tract. There is material for a book on plastic operations on the lids and face. No author will ever find more material in so short a compass.

One or two observations in conclusion. I would like to testify to the generous and spontaneous response made by the American medical profession and by the American people in general. It was not a response, for in most cases no appeal for help had been made. The act of service was a spontaneous manifestation of a kindly sympathetic people to neighbors in distress. They were generous and appreciative in the broadest sense of the term. I might mention in particular, the Boston unit, the Maine unit, the Provi-

dence unit. Each came prepared to undertake all forms of work on the shortest possible notice. Take the Providence doctors and nurses who left on two hours' notice. They were traveling on Sunday and wanted some Red Cross insignia. No shops could be found open at any of the stations through which they passed. They finally compromised with the porter of the sleeper for a discarded green curtain and an old sheet. The Providence unit will always be remembered with regard in Halifax as the Order of the Green Cross. On their arrival at Halifax every hospital had a complete staff. Providence started in to do a first aid in a systematic manner by visiting all the homes about the devastated area where families had bravely attempted to hold together, and tabulating such cases, as well as attending to the wounded. When one of the hospitals was later evacuated, Providence took possession with a full complement of patients ready at hand.

It is useless for me to attempt to acknowledge in proper terms the kindly consideration and hospitality of the people of Halifax, civilian as well as military. All were most keenly sensitive of whatever help we were doing our best to afford. All they had was ours and their homes were our billets. My social experience was an extremely happy one, and in spite of my hard work I actually enjoyed myself.

An outstanding feature, and one which impressed me greatly was the absolute abstinence from indulgence in alcohol. One may be a fanatic regarding the question from both points of view, another may be uncharitable enough to say that whiskey may always be had, and never easier than in a dry town. I did not detect alcohol in the case of a single patient, relative, soldier, or medical officer at a time when indulgence might almost have been condoned as an only apparent solace in grief and depression.

One of the most remarkable statements which I am able to make is that throughout my service, in the presence of death, of suffering, and following the destruction of all that life and home held for them, I did not see one single tear shed while I was in Halifax. I naturally except the children, where a painful dressing was a sufficient excuse. Were the people as a whole stunned or did higher ideals seem to be uppermost, and the most generous and kindly motives to possess all classes and all natures? Everybody served and served gladly, from the highest to the lowest, and those with minor injuries were happiest when trying to help others with wounds more serious than their own.

And so I have come to the end of my story. As the recital of my surgical experience, necessarily sketchy through the emergency of the situation, it is probably of little value, as the tale of a professional adventure it is possibly of some interest, as the testimony of an endeavor to help a heroic and deserving people, it is no more my own than I feel it to be that of all who have taken the trouble to read of my sojourn in Halifax.

CANTHOPLASTY FOR TRACHOMATOUS CONDITIONS.

JESSE S. WYLER, M. D.

CINCINNATI, OHIO.

A description of the conditions produced by trachoma that require resort to canthoplasty, and a form of operation devised to meet these special conditions; with three illustrations. Read before the Eye, Ear, Nose and Throat Section of the Ohio State Medical Association at its annual meeting in 1917.

The use of a canthoplasty in certain phases of trachoma is not a new procedure, but has been advocated by nearly all writers who have had large experience with this disease. It is now just ten years, since I described the extirpation of the transitional folds and tarsal cartilage for the cure of tra-

choma,[1] and time and usage have proven the efficacy of this method.

But the present operation has an entirely different application, and finds its principal advantage in cicatricial stages, with pannus, blepharophimosis and entropion, where a removal of the diseased conjunctiva is impractical, because of the fact that nature in its effort to cure, has converted the entire sac into a shrunken mass of scar tissue. Thereby, not only is the sac greatly contracted, with no healthy mucous membrane remaining; but also this contraction has narrowed the lid fissure and has caused distortion of the lids. The end results thereby produced are:

(1) Insufficient ventilation and poor drainage.

(2) Undue pressure upon the globe with a corresponding increase in corneal destruction.

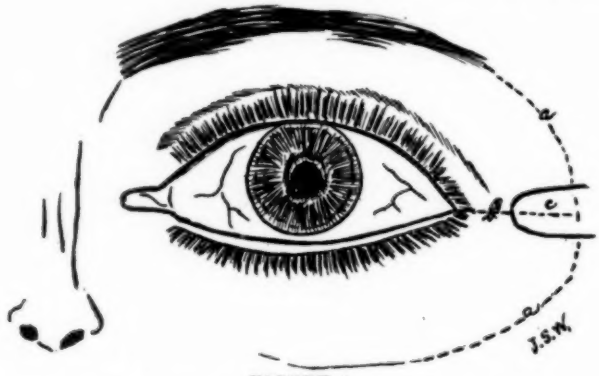

FIGURE 1.

Incisions for Canthoplasty. a Rim of bony orbit; b Direction of canthal ligament and line of the canthotomy; c Incision outlining the flap.

(3) Subjective suffering, from the blepharospasm and trichiasis.

Instead of applying copper sulphat or silver in these conditions and augmenting the already great physical sufferings, with little real benefit, it behooves us to apply a radical measure which will relieve the blepharospasm and enlarge the lid fissure to get improved drainage and make topical applications easier and more efficient.

The first real attempt at operation was made by David Prince in 1866,[2] but a close study of his method reveals the fact that the correction of the existing entropion appealed more strongly to him than the widening of the fissure, and it is this result that is produced. Since Prince's time many modifications and new procedures have been published. Herman Kuhnt, who has to my mind done more to systematize the treatment of trachoma than any one individual, perfected a canthoplasty which proved to be the original after which I patterned my own.

A canthoplasty is a permanent enlarging of the lid fissure in contradistinction to a canthotomy, which is only a temporary measure. The ordinary canthoplasty uses the dissected conjunctiva to cover the tissue denuded by the splitting of the lids. This proves unavailing in trachoma as the contracted, scarred membrane is already too small for its required function. It therefore devolves upon the operator to use a method of preventing the healing of the divided lids by other means. Although my method approaches that of Kuhnt in theory, the technic and application vary considerably. The idea is based upon the use of a small skin flap to cover the denuded canthal angle.

Its performance is possible in any complication, and can be made practically painless with local anesthesia.

The instruments necessary are few. A horn plate, keratome, fine tooth forceps, straight strong scissors, needle holder, a black silk suture doubly armed with medium size curved surgical needles, and hypodermic syringe for the anesthesia.

STERILIZATION.—The lids and surrounding tissue are wiped with benzin and then washed with soap and water. I refrain from the use of iodin when skin flaps are required around the lids. The conjunctival sac is washed out with a sterile solution and the rest of the face is covered with gauze saturated with 1-1000 bichloride of mercury.

ANESTHESIA.—The conjunctival sac is cocainized with 2 or 3 drops of 4 per cent cocain solution. The syringe is filled with 6 parts of 1 per cent cocain to 2 parts of adrenalin solution, and the needle inserted on the conjunctival surface of the outer angle, penetrating horizontally under the skin to a distance of about 5 mm. past the orbital rim. Only a few drops are used, but a wait of about five minutes is necessary to obtain the full advantage of the anesthesia and anemia.

OPERATION.—After inserting the horn plate to protect the eyeball, the temporal side of the lids is put on a stretch, and the extent of the flap to be dissected is outlined with the point of a keratome. This tongue of skin starts about 2 mm. beyond the orbital edge and 2 mm. above the horizontal prolongation of the lid fissure, is carried nasally for half the distance to the outer angle, curves around and returns to a point 2 mm. below the horizontal exactly under the first incision. (Fig. 1.) This small skin flap is now carefully dissected up in its entirety and laid back upon the temple. Inserting one blade of a straight scissors into the

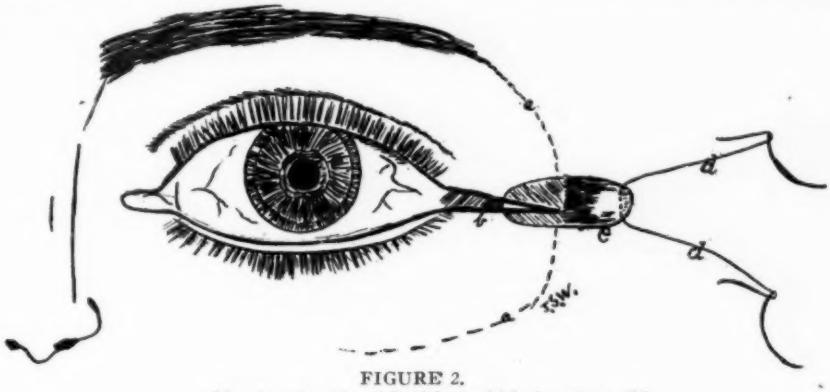

FIGURE 2.

a Margin of orbit; b Incision which lengthens lid fissure; c Flap turned back; d Double-armed suture in flap.

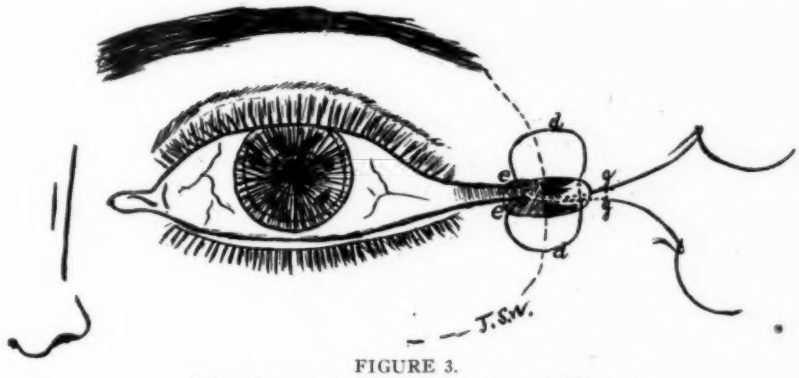

FIGURE 3.

Suture introduced. d Loops of suture; e Entrances of suture, above and below line of canthotomy; g Exits of suture beyond rim of orbit.

conjunctival sac, a horizontal canthotomy is made, reaching to the bony edge of the orbit. The bleeding is very slight due to the adrenalin.

The double armed suture is now inserted through the tip of the flap from the skin surface inward. (Fig. 2.) The needles are then passed one above, the other below the line of the canthotomy, horizontally entering under the palpebral conjunctiva in the extreme angle, passing over the bony edge under the skin of the temple and making their exit about a half inch from the rim of the orbit. (Fig. 3.)

When these two ends are finally tied over a small roll of gauze, the flap is pulled between the cut edges of the skin and lines the angle, readily assuming the crease made by the pressure of the lids, and preventing the denuded surfaces from adhering. No dressing need be applied, as I find the open treatment most favorable for wounds in this locality. The suture is removed on the third day.

ADVANTAGES.—(1) The operation is easy to perform.

(2) It makes a permanently large fissure.

(3) The patient suffers little discomfort, and need not remain in bed.

The Doctors White in their article of recent date,[3] maintain that the Kuhnt flap does not give a permanent result. However, as far as my flap turning method is concerned, I must take issue with this statement. I have been performing the same canthoplasty for over five years, and after this length of time feel that the results have justified my method. Although the White method is most appealing and most ably described, I have never used it; as I feel that the technic of the flap operation is much easier, and I believe that the cosmetic results, none too good at best, are also more favorable.

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NEUROBLASTOMA OF THE RETINA.

C. CLARON HUGGER, M. D., AND JONATHAN FORMAN, M. D.

COLUMBUS, OHIO.

Report of a case of so-called glioma of the retina with an account of the pathologic findings in the study of the specimen made in the Laboratory of Pathology of the Ohio State University. Illustrated by microphotographs.

Neuroblastoma is a group term, used by Mallory for those tumors composed of cells which tend to differentiate into nerve cells. He describes ("Principles of Pathologic Histology," 1914, p. 359) the variety of this tumor found in the eye as follows: "It is always congenital and often bilateral. It destroys the eyeball and may invade the brain. When the tumor grows slowly its structure can readily be made out. It forms small gland-like cavities lined by cells which produce more or less perfect rods and cones. These structures project thru a limiting membrane just as in normal retina. From the other end of each cell projects an axis cylinder process. When the cells proliferate rapidly the gland-like cavities cease to be formed altho the axis cylinder processes may still be. With more rapid growth, cell differentiation ceases and the tumo passes into that ill-defined group, " so-called small round cell sarc Owing to necrosis and absorption, a perithelial arrangement of the tumor cells around the blood vessels is frequent."

The following case illustrates most of the important clinical and pathologic features of this type of tumor:

NEUROBLASTOMA OF RETINA

HUGGER AND FORMAN

FIG. 1.—A MICROTESSAR PHOTOGRAPH OF POSTERIOR PORTION OF EYE, SHOWING RELATIONS OF TUMOR. (SEE TEXT.)

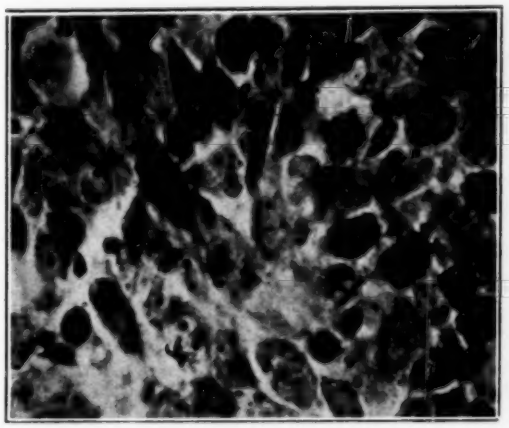

FIG. 2.—AN AREA TO SHOW VARIATION IN SIZE OF CELLS.

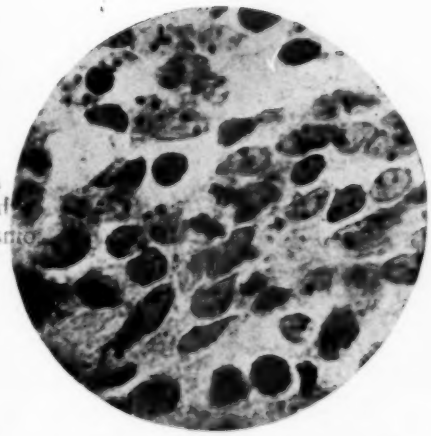

FIG. 3.—A MITOTIC FIGURE IN BORDER OF TUMOR MASS.

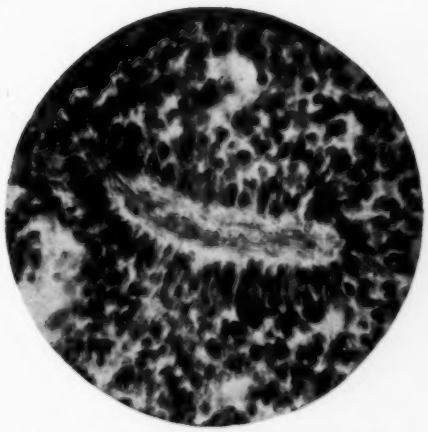

FIG. 4.—ARRANGEMENT OF CELLS ABOUT BLOOD VESSELS.

After having consulted several physicians about a swelling of the eye of her two year old child, the mother brought the child to the Park Street Dispensary. At this time, the vitreous cavity was found to contain a distinct mass and a diagnosis of glioma of the retina was made. Removal of the eye was advised but the parents refused. Three months later the child was returned. The bulging of the eye was decidedly more noticeable. The vision was gone and it was impossible to see into the vitreous cavity. Enucleation was again advised but refused.

The condition continued to grow steadily worse until at the end of four weeks the parents begged for an enucleation to be performed. The entire contents of the orbit were eviscerated. In about ten days, a paralysis of the lower extremities occurred. This progressed and extended over the entire body. In about one month from the time of the operation, the child died. An autopsy was not granted.

PATHOLOGIC REPORT.—The eye is spherical with a diameter of 2.5 cm.

Upon section the cornea measures 4 mm. in thickness and is regular in contour. From its attachment to about its middle, the iris is in intimate apposition with the posterior surface of the cornea. The lens occupies its normal position and is not the seat of apparent pathologic process. The vitreous cavity presents along its wall four whitish nodules. The largest of these nodules is situated just to the side of the entrance of the optic nerve (Fig. 1a), and measures 1x0.7 cm. The greater part of the remaining portion of the cavity is filled with a reddish gray mass.

Microscopic examination reveals the nodules to be portions of an infiltrating tumor. So completely does this tumor line the vitreous cavity that it is not possible to identify the retina at all.

The cells of the tumor vary in shape from large elongated cells to small round ones. In the more differentiated areas the elongated cells contain a nucleus rich in chromatin and placed at the one end. Rarely there is an apparent attempt to form gland-like cavities. In the largest tumor mass near the entrance of the optic nerve, a rather extensive degeneration has occurred among the tumor cells. Only those cells remain which are near a blood vessel. In the border of this mass, mitotic figures are abundant. In the adjacent masses, there is little degeneration. The cells are closely packed and are small and round with a nucleus very rich in chromatin. The stroma is scant and the blood vessels are few. In the posterior portion of the eye, the tumor cells have invaded the choroid and sclera. Using these tissues as a framework they have grown on thru, and a few of the tumor cells appear on the outer surface of the sclera.

On the left side, the smallest mass (Fig. 1b) extends to and infiltrates the ciliary body. The small flat nodule on the right side (Fig. 1c) extends along the wall of the cavity and becoming progressively thinner is lost at the equator.

The material filling the greater part of the remaining portion of the vitreous cavity is an old hemorrhage. It is composed of fibrin, pigment, and calcified plaques. This mass is intimately attached to the tumor mass on the right side by a zone of granulation tissue so that in the process of preparation a line of cleavage has been established in the tumor mass on that side.

To summarize, the position of the tumor, the age of the patient, the clinical course of the tumor, would suggest a neuroblastoma of the retina. The tumor has grown so rapidly that in many areas the tumor consists of masses of closely packed small round cells, making the recognition of the type of the tumor impossible at these points. In the more differentiated areas, however, the tendency to develop tubule-like formations lined by elongated cells which repeat more or less closely the structure of the retina and the production of the axis cylinder processes in the cells of these areas, even where the gland-like structures are not formed, warrant the diagnosis of a neuroblastoma of the retina.

STEREOSCOPIC AND PERSPECTIVE VISION.

ISADORE FRANKLIN, M. D.

SHEBOYGAN, WIS.

This paper points out the differing significance of these two terms, and indicates the numerous factors that enter into perfect binocular vision. It also suggests the experiment of reversing the position of the two pictures viewed through the stereoscope. This experiment should be tried in order to appreciate the important points brought out in this paper.

Concerning the nature, relationship and modus operandi of these two visual senses, there exists in ophthalmic literature, it seems to me, considerable confusion. Dr. Ball in his "Modern Ophthalmology" expresses the prevalent views on the subject, when he says that "This (stereoscopic vision) is another name for binocular vision or the sense of depth." He asserts a truth, when he states that "An object appears to us solid when each eye views it from a different point;" but follows it with the conclusion that "It is the unlikeness of the two pictures which gives the idea of depth." And again that "This (stereoscope) shows that the perception of depth is caused by a slight nonidentity of the retinal images."

By reaffirming well established truths concerning this subject, and treating it from the point of view of my reflections and observations, I hope to show that stereoscopic vision, and perspective vision or the sense of depth, are essentially different, though they complement each other in a rather complicated manner; that neither of them is necessarily binocular; that the stereoscope shows, on the contrary, that it isn't the slight nonidentity of the two retinal images that produces the sense of depth; and finally that stereoscopic and perspective vision are relative terms, the elements of both senses existing in various degress and combinations in all forms of image formation.

Stereoscopic vision, or sense of solidity or of "relief," or what is more vulgarly, tho very aptly described as "standing out effect," must be sharply differentiated from perspective vision, or sense of depth. *Stereoscopic vision* may be defined as the sense of seeing an object from two different aspects, which through the association of stereoscopic memory gives the impression of solidity. *Perspective vision,* on the other hand, may be defined as the sense of seeing objects at varying distances, which through the association of memory of bodily or limb excursions through space, produces a vivid sense of depth.

In case of stereoscopic vision, it suffices to fix an object with both eyes to get a complete sense of solidity. The muscles of convergence and accommodation, tho in use, are not called into "play." Whereas to obtain a complete sense of depth, it is necessary to converge and accommodate for varying distances. The difference is therefore quite clear: One is static and the other principally dynamic in its nature.

On analyzing the two senses, even apart from their psychologic aspects, the elements that enter into their make-up are surprisingly numerous and complicated. The following are the factors which separately or in combination produce the effects of stereoscopic and perspective vision.

ELEMENTS OF STEREOSCOPIC VISION OR SENSE OF SOLIDITY

1. Sense of seeing an object from two different aspects.
2. Sense of completeness of image thru the mutually complementing effect of two different images.
3. Shadow effects.
4. Augmenting effect of perspective vision.

ELEMENTS OF PERSPECTIVE VISION OR SENSE OF DEPTH

1. Sense of seeing objects at varying distances through (a) the play of the muscles of convergence; and (b) the play of the muscle of accommodation.
2. Blurring of part of the field of vision in an antero-posterior direction,

due to (a) doubling in front and beyond point of convergence; (b) being out of focus in front or beyond point of accommodation; (c) diminution of images below visual angle with increasing distance; and (d) atmospheric effects.

3. Relation of size of images to distance.

4. The relative position of objects in which we are accustomed to find them.

5. The enhancing effect of stereoscopic vision.

It is hardly necessary to state that the sense of seeing an object from two different aspects is the most important element in stereoscopic vision. This factor, however, is in its turn composed of the following separate elements: (a) sense of converging muscles; (b) sense of common source of rays [identical location of image on both retinas with respect to field of vision, same side]; (c) sense of difference of the two retinal images. Though the sense of converging muscles is normally a factor in producing the sense of common source of rays, it is not essential, since it may be replaced by prismatic effects. Furthermore, both factors combined, (a) and (b), are incapable of producing a stereoscopic effect without the aid of factor (c), since merely fixing a picture of a solid with both eyes doesn't by itself produce a stereoscopic effect, because of the absence of sense of difference of two retinal images. This last element is therefore important; but only in so far as it contributes to the principal factor, that of seeing a solid from two different aspects. Alone it is quite incapable of producing a stereoscopic effect.

If we hold the two stereoscopic pictures in front of the eyes, so that each eye is looking into the center of its picture and the visual axes are parallel, no stereoscopic effect will be obtained, even though each eye perceives a different image, the reason being that we are looking at both pictures from the same aspect (same plane). True, the pictures must be made to overlap, but not for the mere purpose of "uniting" them, that is incidental, but to give the eyes the sensation of looking at one thing from two different points.

Nevertheless, the fact that each eye perceives an image from its own point of view is a factor of some value in itself, since each image complementing the other produces a sense of completeness to which we are accustomed when looking at real solids with both eyes.

Powerful as the principal factor of stereoscopic vision is, it is not capable of producing a complete effect without the aid of shadows. A cube, the three presenting sides of which are equally illuminated, will lose a great part of its solid appearance. On the other hand, a picture of a cube drawn with one eye open, but properly shaded, does produce a strong stereoscopic effect. Suffice it furthermore to reflect, that solids do not appear flat, even if one does look at them with one eye; though to be sure, they lose much in "relief." Binocular vision, therefore, tho important, is not essential for stereoscopic vision.

It is in monocular stereoscopic vision particularly, that the contributing effect of perspective vision is of value, since a sense of antero-posterior extension of an object cannot fail to produce a sense of solidity.

PERSPECTIVE VISION

In examining the elements of perspective vision, it is obvious that the sense of play of the muscles of convergence is a powerful factor in producing a sense of depth, since the distances of objects correspond to the efforts of convergence; tho it is to be remembered that beyond about twenty feet, it ceases to be of value, (which incidentally applies to the stereoscopic vision.)

In the stereoscope, as well as in real life, it is the principal factor of producing a complete sense of depth. Again, more so than in a case of stereoscopic vision, I must emphasize that it is not the mere dissimilarity of the pictures that produces a sense of depth, but the *actual play of muscles of convergence that the stereoscope as well as conditions in real life require.*

It is almost unbelievable that "flat" pictures in the stereoscope, where all images arise from one plane, should re-

quire the convergence of the visual axes for various distances. It is, however, explained by the following: Because of each picture being taken from a different point of view, the objects in each picture are placed away from its outer field towards the center of binocular fixation (towards inner edge of picture). This relationship is strongest in the foreground of the picture, and is gradually reduced towards the background, i. e. objects in the foreground are displaced more towards the binocular center than those in the background. The result is that the eyes actually converge more for objects that are supposed to be near than for objects that are supposed to be far, giving rise to a powerful sensation of depth.

Supporting proof is to be had in the following experiment: An ordinary stereoscopic card is cut so as to separate the two pictures. They are then approximated with their outer edges, so that they are reversed in relation to each other. Thus placed in the stereoscope, they are brought as near to the eyes as is comfortable. When thus used, a remarkable effect is obtained—the view is turned "inside out," i. e., objects that should appear in the foreground appear in the background and vice versa. [It may be necessary to look for some time to get the effect, since the other factors of perspective vision militate against such an unnatural arrangement of things.]

The explanation for this phenomenon is easily to be had in the fact that because of the reversed positions of the pictures, the displacement of near objects is toward the outer field instead of the inner field, with the result that the eyes converge less for objects in the foreground than for those in the background; for which reason, what should appear near appears far, and vice versa. It is impossible, on the other hand, to see how the mere interchange of dissimilar pictures, per se, could produce such phenomenon. It appears to me that the theory that "The perception of depth is caused by a slight nonidentity of the two retinal images" is definitely disproven from the above consideration.

The play of the muscles of accommodation is next in importance. As in the case of convergence, the distance of objects corresponds to the accommodative effort, though again beyond twenty feet it is of no value in judging distance. As already mentioned, it is a great aid to monocular stereoscopic vision. Let us bear in mind that even though we look at a series of solids with only one eye, we still have a strong sense of depth. Thanks to the play of accommodation and several other minor factors, we are able to get a fair sense of depth without binocular vision (convergence play).

The next subjective element in our sense of depth is blurring of a part of the field of vision (in an antero-posterior direction). Experience has taught us that when objects are blurred within twenty feet, it is either because they are in front of or beyond our point of convergence (doubling); or because they are in front or beyond our point of accommodation (out of focus). Ordinarily we are but vaguely aware of the condition, but nevertheless unconsciously, we are in part guided by it in projecting objects into their proper depth. The blurring of images because of increasing distance and because of atmospheric effects (decrease of air transparency, etc.), is of great value in perspective vision beyond the twenty feet limit.

It is common knowledge that we judge distance of objects by comparing their apparent size with what we consider their real size. And this is another useful factor in perspective vision beyond twenty feet. That to a certain extent we judge the relative position of objects as we are accustomed to find them, is perhaps not so generally suspected, but is nevertheless true. For example, a half mile away, we cannot by our natural optical means really tell whether a tree is in front of a building or in its wall. Nevertheless, knowing from experience that trees grow in front of buildings and not in their walls, we are strongly under the impression that we really see it in front of the building.

In this connection, it may be mentioned that the apparent direction of movement of objects and their motion in general, is of some aid in both perspective and stereoscopic vision, as is particularly the case with the "moving picture."

As to stereoscopic vision as a factor in perspective vision, it is but necessary here to repeat that it is in itself an important guide in estimating the depth of objects, since *the solid appearance of objects decreases with distance.*

I am now aware that it will be objected to the idea of regarding minor elements, here enumerated, as genuine factors of stereoscopic and perspective vision, on the ground that they are largely mental in their nature, and not real optico-physiologic phenomena (such as sense of convergence, accommodation, etc.). To this I must point out that neither the sense of solidity nor the sense of depth are purely ocular. Not all the factors of stereoscopic and perspective vision combined could produce either the sense of depth or solidity without the association of other senses, particularly the tactile and muscle senses (of the body in general). Suffice it to mention here, the well known observation that those seeing for the first time must develop a sense of depth and solidity by learning to associate their ocular impressions with their tactile and muscular experiences. In other words, the senses of depth and solidity are neither essentially ocular, nor tactile, nor muscular in their nature; but are a psychic complex, outgrowing principally from the above three senses, but embracing in addition other mental reactions to bodily experience.

It may now be of interest, for the purpose of emphasizing the relativity of the senses of depth and solidity, to briefly examine the combinations of elements which enter into the various forms of image formation.

Beginning with the photograph, the "flattest" image of all, we find that we are by no means justified in considering it devoid of all stereoscopic and perspective effects. And it is indeed surprising how many of the elements are present. To begin with, in photographs in which the light is well handled, the shadow factor does produce a strong stereoscopic effect. As to perspective effects, all factors, except those of accommodation and convergence play, are present. The sense of depth due to the blurring of objects which are out of focus is especially marked in photographs, for which reason a good photo-portrait rivals a portrait painting in stereoscopic effects.

In paintings this factor is absent, since the artist accommodates, and therefore paints all objects within twenty feet with equal clearness. This is quite a defect, and is one reason why paintings lose in perspective the closer they are looked at. It is however partly compensated by objects being represented "complete"; i. e., as seen with both eyes. In addition, the artistic handling of atmospheric effects in landscapes (and other stimuli to imagination lacking in the photograph), makes the effect of depth in paintings far superior to photographs.

The stereoscope, already discussed, differs from the image formation in actual life by lack of accommodation play, and indeed lack of accommodation altogether, since it is replaced by the use of convex lenses.

As to actual life, it is but necessary to repeat that all factors of stereoscopic and perspective vision are present up to the twenty feet limit. Beyond that everything depending upon convergence and accommodation is, of course, absent.

PAINFUL ACCOMMODATION.

JOHN GREEN, JR., M. D., F. A. C. S.

ST. LOUIS, MO.

An account of this condition, first described by Donders, with reports of three cases. Read before the American Academy of Ophthalmology and Oto-Laryngology at Pittsburgh, October 30, 1917.

In the last few pages of his epoch-making book "On the Anomalies of Accommodation and Refraction of the Eye,"[1] Donders discusses "Spasm of Accommodation," and "Painful Accommodation." He is careful to distinguish between the normal tone of the ciliary muscle and the "exalted" tone which in hypermetropia and sometimes in astigmia, "wholly or partially conceals the abnormal condition." He is frankly skeptical about the existence of acute spasm (comparable to the spasm produced by physostigmin) and explains his skepticism on the ground that he has "never met with a clear case of it."

The relation between the physiologic tone and the pathologic exalted tone or contracture of the ciliary muscle is discussed by Lancaster and Williams in their careful study.[2] They quote Howell's text book of Physiology as follows: "By tone is meant a state of continuous contraction which is slight in extent under normal conditions." Contracture is defined by these authors as "a state of maintained contraction, or, looked at from the other and, as it seems to us, better point of view, a state of retarded relaxation." As they remark, "Contracture is an excessive activity and should be stopped"—"tonus is normal and physiologic and does not need to be stopped." The task of the examiner is, therefore, to determine how much of latent hypermetropia is due to tonus, and how much to contracture, and to prescribe a glass which shall do no more than "relieve the excessive action."

We are all familiar with the great variety of asthenopic symptoms, including pain, occurring in hypermetropic individuals as a result of this contracture of the ciliary muscle. The existence of contracture is readily proved by the use of atropin, which discloses the great difference between the manifest and total error. Accommodation associated with pain due to contracture does not require comment. But there is an important group of cases in which pain, often of great severity, is evoked by accommodation and in which there is little or no evidence of accommodative cramp. It is this accommodative anomaly, designated by Donders "Painful Accommodation," to which I desire to draw your attention. Perhaps a synopsis of a case related by Donders may help to make the clinical picture clear.

A patient residing in the East Indies experienced pain on making observations with optical instruments. His state was considered to be hyperemia of the retina. On reading and in calculating his observations the pain increased. Under atropin, hypermetropia of 1.5 was disclosed. Convex glasses, both weak and strong, failed to relieve. Derivants and leeches were tried, with equal want of success. Reading for a few minutes produced pain which compelled him to desist. After suffering eighteen months he wrote to Donders, who ordered atropin twice a week and convex glasses of different strengths for work at different distances. Almost at once the pain ceased. I give the rest of the history in Donder's own words:

"When after a first disappointment, the use of atropia was, a few months later, for the second time suspended, the pain on tension of the accommodation did not return, and so far as I am aware no disturbance whatever has since recurred in making observations, reading, writing or calculating. This case scarcely needs any comment. It shows that in slight degrees of H. a condition may be developed by continued tension in which the least accommodation for near objects becomes very painful. Spectacles are then of no use, because with the convergence involuntary accommodation is

combined, and this again excites the pain."

Later writers have sought, and with much reason, to associate this accommodative anomaly with certain states of nervous instability,—notably neurasthenia and hysteria. The modern view is well expressed by de Schweinitz,[3] who says:

"Patients of the hysterical type are afflicted with markedly painful visual sensations, notably dread of light, lacrimation, blepharospasm, neuralgic pains which appear in the neighborhood of the ocular globe and radiate to the temporal and zygomatic regions, and imperfect eye endurance. To this set of symptoms the term hyperesthesia of the retina has sometimes been applied. They represent the condition which Förster described as *hysterical kopiopia,* Donders as *painful accommodation,* Nagel as *hyperesthesia of the ciliary muscle,* and Schenkl as *hysterical ocular pain,* but which, in general terms, may be classified under 'painful visual sensation' or 'hysterical asthenopia.'

"Any effort of vision, particularly at close work, is quickly followed by ocular pain, brow neuralgia, and diffuse headache, often with micropsia and obscuration of vision, and quickly by fatigue.

"We have in these cases, according to Binswanger, to deal with hyperalgesia manifesting itself through light impressions, and he believes that these hyperalgesic conditions form part of a general hyperalgesia, most pronounced in certain forms of hystero-neurasthenia."

CASE REPORTS:

Mrs. G. D., age 55, consulted me July 17, 1917, with the complaint that for the past six years she has had increasing difficulty and pain in near vision. The condition has become greatly aggravated during the past six months, so that at this time it is "real torture" to try to read. Recently, too, she has had "spells of trying to look through shadows." The patient has worn bifocals for thirteen years, has had numerous changes, the last eight months ago.

She is greatly depressed over her ocular troubles, and has about made up her mind that she is doomed to irremediable pain, if she uses her eyes, and hence has very largely given up near work. Nor is the fear of impending blindness very far in the background. She tells her tale in rather a hopeless way, and clearly conveys the impression that she has lost confidence in all oculists, her present adviser included. She is constantly shifting her position in her chair, throwing her head from side to side, and moving her hands aimlessly. Questioned as to bodily pain; she denies it, but says she is nervous all over and cannot keep still.

Repeated tests indicated a compound hypermetropic astigmatism, but as there was much uncertainty in regard to the strength and axis of the cylinder, homatropin was ordered. The cyclopegic test yielded:

O. D. $+2.75 \bigcirc +.25$ c. ax. 120° V 6/5
O. S. $+2 \bigcirc +.75$ c. ax. 60° V 6/5

Bifocals, based on a post cycloplegic test, were ordered as follows:

O. D. $+3. +.25$ c. ax. 120°
O. S. $+2.37 +.62$ c. ax. 60°; $+2$ added.

The muscle balance showed orthophoria at 6 m. and exophoria 3° at 33 cm. Accommodation 1 D. Ophthalmoscope negative, save for a little undue tortuosity of the finer vessels adjacent to the macula. Tension, R. and L. 15 mm. Hg. Fields normal.

As my final result did not differ conspicuously from the prescription given by my predecessor, I felt assured that should I pursue the inquiry no further, I should probably be classified in the patient's mind as the latest and least successful of her ophthalmic advisors. It seemed worth while, therefore, to gain some knowledge of her life and ailments. Hers was the typical story of a farmer's wife—hard physical work, an early struggle to make both ends meet, the bearing of children, and the denial of personal necessities over a long period of years in order that the children might have educational advantages. At the birth of her first child she sustained a bad perineal laceration. This was not repaired and during subsequent pregnancies she suffered extremely. A secondary repair was successfully made fifteen years later. To add to her troubles, her

teeth had given her "lifelong misery." All were finally extracted, save two or three incisors in the lower jaw. Menstruation ceased four years ago.

X-ray examination of the few remaining teeth showed marked pyorrhea and in one an apical abscess. They were extracted. The patient was referred to Dr. F. M. Barnes, Jr., for neurologic examination. His inquiry elicited the following additional facts: On going to bed she has what she calls "nervous fits" for an hour or so, she "wiggles and turns," cannot get to sleep and experiences some disagreable and uncomfortable sensations in the occipital region. She is inclined to worry over trifles. She has one son of the draft age, but is not worried over the possibility that he may be drafted. The physical and neurologic examination proved wholly negative. Dr. Barnes writes: "It is rather hard to find a definite term which exactly sums up her condition, but perhaps a neurasthenia incident to the period of the menopause expresses it about as well as can be." Ovarian extract was ordered and a strong assurance was given the patient that she would get better. She was dismissed with the injunction to use her eyes for a certain period daily, stopping the moment pain manifested itself, and to endeavor to increase the period of near work each day.

It was clear that the patient had taken a new grip on life; her outlook, filled with gloomy forebodings, had been replaced by optimism. A letter of inquiry recently addressed to the patient elicited the following reply: "After having to begin over several times, I have reached the point where I can read for an hour in the morning and again in the afternoon, but not more than 15 minutes by artificial light. I am getting along very comfortably, eyes and general health both."

Case II. Dr. X consulted me November 8, 1916. In order properly to understand the present state of our patient, it is necessary to sketch, briefly, his career. After graduating in medicine he set out to achieve a large measure of success as a practitioner. The will to do was there, and he had the physical capacity to make his body do his every bidding. He was successful from the start. He entered actively into the work of various medical societies. He held various teaching positions in his medical school and ultimately occupied the chair of surgery. For twenty years it was one continual grind from early morning to late at night. Often he would come in at midnight, tired out after a round of visits, and spend the next two or three hours preparing himself for the next day's lecture or demonstration. And because he had the physique he could do all these things. And so, year after year, he kept driving on—with never a thought of the break that, sooner or later, must come.

In spite of his strenuous life he supported, with equanimity, a moderate hypermetropia, with a low inverse astigmia. Without experiencing any of the signs of early presbyopia, he reached the age of 47 when, rather suddenly, the accommodative strain became too great. After a morning's operating, he would pass a wretched afternoon, with bloodshot, aching eyes. The oculist consulted prescribed reading and operating glasses with bromides internally. There was no relief, rather the symptoms increased in severity. Finally a sea trip was planned and undertaken. Not for a single moment during this five weeks' vacation were our patient's eyes in the least degree troublesome. He sedulously abstained from reading, and came back early in the autumn rejuvenated and fully convinced that his eye troubles were definitely at an end. But his hopes were dashed the first morning he attempted to operate—the eyes burned and ached. That afternoon was spent on a couch in a dark room with cool cloths applied to the closed lids. Through September and October he led a miserable existence, endeavoring to get through with the accumulated operative work of the summer, and spending his afternoons and evenings in ocular misery. He was fond of social life, but found the bright lights of the drawing room intolerable. "On several occasions," he told me, "it has required all my will power to remain in a friend's house the time demanded by the rules of courtesy." Such an experience would be followed by a sleepless night.

His appearance did not denote a man who had been through great suffering. Rather he seemed well preserved and physically energetic. His refraction proved to be a compound hypermetropic astigmia as follows:

R. + 0.87 ⌒ + 0.5 c. ax. 165° V 6/4
L. + 1.12 ⌒ + 0.37 c. ax. 180° V 6/4

Accommodation 2.75 D. either eye. Muscle balance at 6 m. showed lateral and vertical orthophoria.

Prism adduction 17°, prism abduction 4°; 3° exophoria at 33 cm.

Reading glasses, as follows, were prescribed:

R. + 2.12 ⌒ + 0.5 c. ax. 165°
L. + 2.37 ⌒ + 0.37 c. ax. 180°

A week later the patient reported "absolutely no improvement." Distance glasses were prescribed as follows:

R. + .75 ⌒ + .37 c. ax. 180°
L. + 1. ⌒ + .37 c. ax, 180°

A rhinologic examination was negative.

The patient absented himself for a month. On his return he stated that matters had been going from bad to worse; that he had faithfully used the distance and reading correction without any appreciable effect on his symptoms. In despair he had, toward the end of the month, broken away from work and gone to his farm in a distant state. There, freed from the necessity of using his eyes, he had gotten some relief. Immediately on resuming work at home the symptoms had recurred in all their severity. Bifocals were ordered. Astringents were used for several days to combat a slight conjunctival irritation.

One month later (January, 1917), it was clear that no progress was being made. The effort to use the eyes invariably produced an intense deep seated ocular pain, lasting all the rest of the day and often well into the night. At times it became almost unbearable, suggesting morphia which, however, our patient had the good sense to refrain from using.

It was now clear that we were dealing with an intensely irritable ciliary muscle and the indication was for complete physiologic rest. Accordingly, having satisfied myself of the absence of glaucoma, I prescribed atropin sulphate ½% t. i. d. On January 2, 1917, three days later, the patient reappeared, overjoyed, stating that yesterday was the first comfortable day he had had since September. His relief was complete and he was entirely willing to put up with the unpleasantness of a dilated pupil and functionless accommodative apparatus. He was kept completely atropinized (1% five times daily) for three weeks. During this period he was absolutely free from ocular discomfort. His total refractive error proved out:

R. + 1.37 ⌒ + 0.25 c. ax. 150° 6/4
L. + 1.5 ⌒ + 0.37 c. ax. 30° 6/4

(If reference is made to the precycloplegic measurement, it will be seen that the latent hypermetropia is only 0.5 D., which is accounted for by the physiologic tone of the ciliary muscle.)

Bifocals were prescribed as follows:

R. + 1. ⌒ + 0.25 c. ax. 150°
L. + 1.12 ⌒ + 0.37 c. ax. 30°; + 2 added.

All use of the eyes was interdicted for two weeks more. From this time, progress was slow but steady. In view of the beneficial effect of outdoor life (as evidenced by improvement on former vacations) the patient was urged to abandon his practice and go back to his farm. Fortunately, our views coincided, and early in February, 1917, the patient betook himself to his farm, where he undertook a systematic reeducation of his dilapidated ciliary muscles. In the beginning he was limited to two minutes' reading three times a day. As this amount was possible without ocular discomfort at the time or pain afterward, the periods were gradually increased. Under date of June 21st, he writes, "I am still improving. The last three weeks have been better than any similar period during the past year, except when I was not using my eyes at all for close work. I am now using my eyes forty minutes twice daily without pain."

Case III. Mrs. L. E. H., widow, age 62, first seen Dec. 22, 1916, came complaining of "terrible" suffering when she attempted to use eyes. "The eyes feel

like balls of fire." Examination showed no external ocular abnormality save slight shrinkage of the conjunctiva of the lower fornix (for this I cannot account as there was no history of conjunctival affection). The fundus was normal. Refraction proved to be a compound hypermetropic astigmia as follows:

R. $+2.25 \bigcirc +1.75$ c. ax. $75° = 6/5$
L. $+2. \bigcirc +1.$ c. ax. $105° = 6/5$

Accommodation 1 D. Orthophoria for distance. 3° exophoria at 33 cm. Prism adduction 24°. Prism abduction 7°. Bifocals prescribed:

R. $+2.25 \bigcirc +1.75$ c. ax. 75°
L. $+2. \bigcirc +1.$ c. ax. 105°; +3 added.

Examination by Dr. L. K. Guggenheim disclosed a subacute rhinitis and markedly hypertrophied tonsils containing pus. The left ear presented all the symptoms of a chronic adhesive process with atrophic changes in the cochlea. The condition of the tonsils was so bad that, in spite of the patient's age, their removal was deemed imperative. The operation was performed under local anesthesia, and was followed by several days of extreme prostration, during which time the patient remained in the hospital. About two weeks later she appeared at the office, thoroughly shaken, trembling all over, and complaining of great pain in the eyes and head. She was seen at intervals during the winter, her complaint being monotonously the same—utter inability to use the eyes for more than a minute. Efforts to prolong their use were attended by severe burning sensations followed by intense aching pain. The pain did not terminate with the termination of reading, but persisted into the evening and indeed all night. The patient was tractable and willing. She followed instructions to the letter. I hoped, by reading tests of short duration, beginning with one or two minutes, and gradually increasing the period, to train the irritable ciliary muscle to functionate more nearly normally. My endeavors were vain. Toward the end of June she appeared, stating that for several days she had had severe pain in the left upper arm and shoulder. A doctor had told her that she probably had a "tumor." Fear of amputation and the very evident severe pain, brought her to a pitiable state of nerves and tears. She was on her way to her home town and was about to place herself in the care of her cousin, a physician. Two weeks later she reappeared, her arm and shoulder wholly recovered. Her physician, Dr. Rendleman, of Cairo, Ill., informs me that her trouble was purely functional.

During July she was kept for two weeks under atropia; relief was complete, but after the effect of the drops had worn off she was still wholly unable to use her eyes on account of pain. It seemed clear enough that I might work with the patient till doom's day and yet reach no satisfactory result.

Dr. Barnes, to whom the patient was referred, elicited the following additional data: "The present trouble began about nine years ago, at first with severe supraorbital headaches, soon after associated with severe pain in the eyes in use. Her illness has been progressive, new symptoms having appeared from time to time until now they are 'almost innumerable' —principal among them are nervousness, 'fainty spells,' indigestion and nausea without vomiting and insomnia.

"The patient talks volubly, recounts her symptoms in great detail and with many extravagant expressions regarding her sufferings. She is accurately oriented in all fields, shows no hallucinations or delusions, her insight is fair, memory unimpaired; there is no evidence of deterioration." There was no organic involvement of the nervous system. Diagnosis: "Presenile Neurosis of the Neurasthenic Type." On account of the age of the patient, prognosis "not good."

The examples of Painful Accommodation related by Donders were all in persons under the presbyopic age, and references to this subject by subsequent writers that I have consulted make no allusion to its occurrence in middle aged and elderly persons. I am inclined to believe that the condition is not so rare as the paucity of references would seem to indicate. No doubt many cases escape us through failure to put ourselves *en rapport* with the whole physical and psychical history of our patients. I am

convinced that there is always a background of physical or mental stress (often both), eventuating, finally, in some form of nervous instability. The painful irritability of the ciliary muscle may be the sole expression of the neurasthenic state, as in the case of Dr. X., or it may be one symptom added to a multitude of other signs of nerve weakness, as in the cases of the two women. The cases related illustrate, also, differences in prognosis. Where the background is neurasthenia due to a passing physical state (as in Mrs. G. D.) or where the ciliary muscle is solely implicated (Dr. X.), the prognosis is good, although the course may be protracted. But with Mrs. L. H. the situation is different. In her the development of the neurasthenic state has been very gradual—she has passed from middle to old age, acquiring a long list of nervous manifestations. "You cannot teach an old dog new tricks" and you cannot reeducate an elderly neurasthenic. If the prognosis, from the general neurologic standpoint, is dubious, it is not likely that the disordered ocular function can be restored to normal.

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THE TOXIC ACTION OF EMETIN ON THE EYE.

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DULUTH, MINN.

The report of accidental and experimental instillations of solutions of emetin into the eye, and their results, including a special form of irritation, myopia and spasm of accommodation.

CASE 1. A 2 per cent solution of homatropin hydrobromid was ordered for a young woman, with directions to use the drops every half hour, but when she came for her examination there was little or no cycloplegic action, so another bottle was used. At this time there was no redness nor complaint of smarting; but ten hours later she first noticed that the eyes "began to look pink," and at the end of sixteen hours watering and burning was complained of.

I saw the girl twenty-four hours after the original solution had been used: there was then photophobia and profuse lacrimation; the lids were held very tightly closed; there was complaint of burning and smarting, headache and pain radiating through the frontal region. The bulbar conjunctiva was purplish-red, and there was some pericorneal injection; skin of the upper lid slightly edematous; no chemosis; no catarrhal or purulent discharge; cornea clear and the iris apparently uninvolved. This lively reaction persisted for a day or two, and then subsided so that the eyes were again normal in appearance at the end of a week.

CASE 2. The solution used by the girl was examined as to taste, appearance and chemical reaction: it answered to that of an alkaloidal salt. The pharmacist who had put it up gave assurance that no error had been made. It was rather taken that we had to deal with an idiosyncrasy, and as the girl expressed great fear that she was going blind, partly to reassure her, a small drop of the solution was touched to the conjunctiva of my own lower left lid. Twelve hours later I retired for the night, having quite forgotten the small incident.

I was awakened very early in the morning by a sharp sensation, such as that produced by a foreign body on the cornea. The irritation which was somewhat intermittent in character continued to increase and was at its height in about eight hours. There was a constant

"scratchy" feeling in the eye which became very intense at about five minute intervals, this being accompanied by a spurting of tears from between the spasmodically closed lids, or down through the left nostril—virtually, an ocular tenesmus.

These attacks were at times attended by sprays of sharp pain radiating through the infra- and supraorbital regions. The globe was slightly sensitive to pressure in the ciliary region. Cocain was of no avail, but cold compresses gave some relief. Vision was not actually disturbed, aside from the blurring caused by the active lacrimation. The upper lid became edematous, but there was no chemosis. The pericorneal injection, and the same violet color of the bulb were again present, as in the case of the girl.

In neither of us was it possible to examine the fundus. The active sensory disturbance persisted for thirty-six hours, after which there remained marked redness of the eyeball for over ten days. A few pinpoint subconjunctival hemorrhages were noted. There persisted through a fortnight a spasmodic myopic astigmatism which at first required — 3.50 sph. ⊃ — 3.50 cyl. axis 180°, above my normal correction to bring the vision up to 20/30. For two weeks after this myopia had disappeared the eye was able to read without its normal presbyopic correction of + 1.00 sph.

The few drops of the dubious solution precluded a chemical analysis. One drop was placed in a rabbit's eye: no reaction for ten hours, but on the day following there was a pronounced congestion. The animal continued to eat, but kept the affected eye closed for two days. Redness gone in three days. A few known alkaloids were now tried on the rabbit's eye, and it was found that emetin alone—in 2 per cent strength—produced the identical reaction as to time and degree.

The hydrobromid salt of this alkaloid had been kept next to homatropin in the pharmacy where the dubious solution had been prepared. The evidence was to me fairly conclusive. I had, however, a patient afflicted with a very old trachoma and a pannus. The nature of the procedure was explained, and one drop of a 1 per cent emetin hydrobromid solution was allowed to remain in the eye for half a minute, and was then washed away. At the end of ten hours there commenced a reaction closely corresponding to those above related, but much milder in degree. The vessels running in the pannus were not found to be much engorged. The course of the disease was not affected.

The general toxicology of emetin has recently been discussed in detail by Levy and Rowntree,[1] Lyons[2] and others.[3] Contrary to the more common opinion the alkaloid often acts as an irritant when used in small doses, producing vomiting and purgation. Among the pathologic findings in animals which have been killed by emetin are hemorrhagic swelling of the gastro-intestinal mucosa, and great engorgement of the abdominal vessels with blood. Peripheral neuritis has in several instances followed the administration of ordinary therapeutic doses. The action on the eye then seems to follow quite closely the toxic effects on other organs and parts; moderately slow in action; little effect on the epithelium and superficial vessels, but deep engorgement, and probably direct attack on the peripheral nerves. In my own case the ciliary tenderness, circumcorneal injection, and after-resulting spasmodic myopia point to a special ciliary involvement rather unique in ophthalmic toxicology.

That ipecac powder is irritating to the nasal and bronchial membranes has long been known. A form of "conjunctivitis" has been attributed to the drug. Ipecac also contains the alkaloid cephaelin which has irritant properties aside from those of emetin. Lewin and Guillery[4] describe the effect of "ipecac dust" on the exposed mucous membrane, and they assume that the irritation is due to the contained emetin, and speak even of the possibility of corneal ulceration. But their description, while having certain points of similarity, does not fully correspond to the detail of the cases here reported. More recently Kalt, Fromaget and Harriet[6] have described a subacute, eczematous type of conjunctivitis due to ipecac, sometimes intentionally applied. A dirty red, salmonlike color of the mucosa is said to be characteristic. I

find no reference to the action of emetin itself on the eye other than a brief note of warning by Dr. J. B. Blue.[5]

The active principle, or dried substance of many of the drugs which act as emetics or drastic cathartics will on gaining access to the eye surface produce a lively reaction. As in the case of emetin the disturbance may not be immediate nor the attack primarily on the conjunctiva. Veratrum album and veratrum viride are both irritants belonging to this class. The alkaloid veratin is more especially dangerous, and may even act as an ocular irritant by systemic absorption. Colchicum and colchicin, lobelia and lobelin, both emetic and purgative in slightly toxic dosage, are local eye poisons.

The acrid milky juice of nearly all of the plants of the genus Euphorbia come close to this toxic division. The "American ipecac" (E. Ipecacuanha), some times used as a substitute for the true Brazilian article, is an eye irritant. The milk of the flowering spurge and the cypress spurge have caused some damage along this line; while "wolf's milk" (E. Helioscopia), long popular in Europe as a remover of warts, has caused not a little serious eye damage when it has been used on the face. The oriental "mudar and yercum," of the family Asclepias, are emeto-cathartic in full dosage, and have some reputation as eye poisons. At least two well known cathartics, elaterium and podophyllin, have had local ocular inflammation charged to them. In this class croton oil is the arch offender. It waits about ten minutes to commence its destruction. One drop is enough to put out an eye. Castor oil, one of the mildest of oily collyria, is certainly a purgative innocent of damage to the eye, but the castor bean is a mucus membrane irritant of considerable action.

[The recent use of ipecac to produce conjunctivitis, as reported in recent journals (6) and (7) gives especial interest to these observations.]

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OCULAR LESIONS THE RESULT OF ORAL AND PHARYNGEAL DISEASES.

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This is a general review of the present status of our knowledge regarding the subject. Read before a joint meeting of the Section on Ophthalmology and Section on Otology and Laryngology of the College of Physicians of Philadelphia, December 7th, 1917, with a bibliography.

The subject of the association of ocular disease with lesions of the mouth and pharynx may be considered under two heads—ocular lesions due to disease of the mouth and pharynx; and, associated lesions of the eye, mouth and pharynx. Time will permit of a discussion of the first class only.

That a causal relation may exist between dental lesions and ocular affections is not a new thought but the proof of this relationship we owe to advances in seriologic and X-ray diagnosis. A review of the cases in which this relationship was believed to have existed, shows that in many instances, this conclusion has been reached on insufficient evidence, the case either not having been thoroughly studied, that other well known causes

might be excluded; or, where proper methods have been pursued, undue importance has been attributed to a focal lesion in the presence of other possible causes.

A consideration of dental lesions falls naturally into the two groups under which they have been discussed by Black,[1] a dental surgeon of Chicago: (1) Reflex neuroses presenting as sensory, vasomotor or muscular disorders; (2) Inflammation of the various tissues of the eye due to infection. According to this writer, the former are practically always due to irritation of the vital pulp of a tooth, although an occasional case may be due to an impacted tooth. The latter are practically always due to an infection involving the peridental membrane either in the form of an alveolar abscess at the root or a pus pocket along side the root.

REFLEX NEUROSES.

It is interesting to note that of the first ten cases of ocular disturbances attributed to dental origin recorded in odontologic literature from 1842 to 1869, ten years of which period was pre-ophthalmoscopic, and the remainder before the ophthalmoscope had any large employment, in all but one, the affection was described as amaurosis; and further, that of 41 references cited by Black from dental journals, in which no less than 27 eye conditions were scheduled, more than one-half were also cases of amaurosis. Bruner,[2] who has recently made a review of the literature, and added cases of his own, enumerates the following reflex conditions: spasm of accommodation, restriction or paralysis of accommodation, spasm of the orbicularis, heterophoria, asthenopia and amblyopia with negative ophthalmic findings. In his opinion affections of the upper jaw teeth are more prone to cause ocular symptoms.

Priestley Smith attributed to dental irritation a case of glaucoma. Of considerable interest in demonstrating the severity of reflex symptoms is Dutrow's[3] case, in which in a man 22 years of age, headache, vomiting, complete paralysis of the left externus with spasmodic contraction of the levators of the opposite eye were entirely relieved by the removal of an impacted third molar. Both normal and complicated dentition may give rise to ocular symptoms; thus Palet has seen kerato-iritis, spasmodic contraction of the facial muscle, conjunctivitis and lacrimation apparently due to irritation arising in the course of the first and second dentitions. That the pressure of a foreign body in a tooth may excite reflex ocular symptoms is attested by the case seen by Würdemann[4] in which severe retrobulbar pain of years' duration was due to a dental spud which extruded from the root of a filled and crowned tooth. Pont's[5] case of temporary disturbance of vision was associated with traumatism of the alveolar-dental ligament by a dental instrument. Both Blum[6] and Brinton, who report several instances of keratitis arising from dental caries, attribute the corneal complication to trophic influences through the 5th nerve and Gasserian ganglion.

ORAL SEPSIS.

A subject of first importance is the ocular lesions arising from oral sepsis. The teeth most often are the seat of the focus of infection. The wide prevalence of amebic disease of the mouth is shown by the investigations of Anna Williams[7] among school children between the ages of 5 and 16 years. She found the ameba present in 29 per cent of children with healthy gums, in 37 per cent with healthy gums but diseased teeth, in 65 per cent with tartar and receding gums, and in 91 per cent of those having spongy and bleeding gums. The oft quoted work of Smith and Barrett[8] demonstrating the relation of parasitic amebas to pyorrhea alveolaris, and the conclusion that they originate bacterial toxins, which not unlikely play a more important part than the amebic toxins themselves, has been of great aid in stimulating the study of the relation of these to ocular disease. Hartzell has shown that 90 per cent of all apical infections yield cultures of streptococcus viridans.

Considering then the wide prevalence of oral sepsis, the generation of endtoxins by the ameba present, and the virulence of the organisms found in apical abscesses, the comparative infrequency

of distant infection can only be explained by a high resistance in the system developed by their long continued presence.

Among the case histories of 10,000 private patients collected by Lang[9] were 215 instances of ocular inflammation in which oral sepsis was traced as the cause. Of these 139 were attributed to pyorrhea alveolaris. The iris was affected 87 times, the ciliary body 79 times and the choroid 65 times. Worth estimates that in more than one-half of the cases of iridocyclitis met with in private practice sepsis (including oral) was the cause, and Butler's[10] experience coincides with this. Ridley mentions a case of persistent iridocyclitis in which the infection seemed to arise from the presence in the postnasal region and at the roots of dead teeth of large numbers of pneumococci and streptococci. The blood gave a pure culture and the feces showed enormous numbers of the organisms. In the well known study by Brown and Irons[11] of 100 cases of nontraumatic iritis in 41 patients, dental infections were demonstrated by radiographs and confirmed by dental surgeons, and in 18 instances these were recognized as the cause of the iritis. Goulden[12] and also Sedwick[13] record instances of recurrent iridocyclitis from oral sepsis. de Schweinitz[14] gives the history of a case of persistent and one of relapsing uveitis due to abscessed teeth; and in commenting upon Goulden's and his own observations says that they indicate that oral sepsis "not only is an etiologic factor in the origin of uveal tract inflammation, but is an important factor in determining, on the one hand, exacerbations, and on the other hand, relapses."

I have had one case in which an abscessed tooth was the probable cause of an exudative choroiditis. The patient was a married woman 26 years of age. The choroidal lesion was just behind the ciliary body and occupied an area 1½ times the size of the papilla. There were vitreous opacities and deposits on the membrane of Descemet. The seriologic tests and blood and urinalysis, made by Dr. Williams, were negative. No examination of the teeth was made until two weeks later, when an abscess was found at the root of the right upper incisor. The treatment of the tooth was followed by rapid improvement in the ocular symptoms, the vitreous opacities alone persisting.

Among ocular conditions less frequently attributed to oral sepsis are episcleritis (Lang), keratitis (Haskins),[15] persistent conjunctivitis, disseminated choroiditis (Davis), herpetic keratitis (Blum). Black mentions a case of exogenous transmission of oral sepsis to the eye. The patient had an abscessed root which caused a slight swelling of the gum. He was in the habit of breaking the abscess by pressure with the finger, subsequently carrying the infection to the eye. In this connection it is interesting to note that among the means of producing conjunctivitis employed by soldiers abroad has been the introduction into the conjunctival culdesac of tartar scraped from the teeth. In Black's case of chronic catarrhal conjunctivitis, which resisted the therapeutic resourcefulness of Casey Wood for 4 years, the patient possessed 27 teeth and 18 of these had pus pockets. Proper dental treatment permanently cured the conjunctivitis.

TONSILS.

That the tonsils have not more often been found to be the source of the ocular infection is surprising, when we consider how frequently they are blamed for general infection. To quote again from Brown and Irons' analysis of 100 cases of iritis, in 16 the tonsils were said to have been clearly the source of infection, and in several cases of iritis due to other causes the tonsils were found containing pus. Wescott,[16] who has seen a number of cases of iritis due to tonsillar infection thinks the exciting cause of the ocular inflammation may be a slight trauma. In one of the two cases of paralysis of accommodation due to faucial tonsillar infection, reported by Veasey[17] the iris was also involved. In the second case the tonsillitis was of an acute relapsing type, the diphtheria bacillus was not found and reading power was quickly restored after extirpation of the tonsils.

PHARYNX.

Schmigelsky, in 541 cases of trachoma and 85 cases of follicular conjunctivitis, found follicular pharyngitis present 351 times, or 64 per cent. As in follicular pharyngitis normal conjunctivas were present in but 42 per cent, he concludes that a causal relation exists between follicular pharyngitis, follicular conjunctivitis and trachoma. Unhygienic conditions of the nasopharynx is held responsible as a factor in phlyctenular disease by Allen and many other clinicians.

May finds that adenoids in children may be associated with blepharitis, dacryocystitis, congestion of the conjunctiva and phlyctenular disease, and certain forms of conjunctivitis resembling trachoma, and regards them as predisposing to these conditions or aggravating them, a connection explained by the congestion of neighboring parts produced by the adenoids. In a similar way may be explained Posey's[18] case of exophthalmos due to adenoids.

Kirkendall believes that they operate to produce phlyctenular kerato-conjunctivitis by causing the rheumatic diathesis and deflected septa, which produces pharyngeal catarrh, sinuitis, autotoxemia and infection. Adams cites a number of cases to support his contention that adenoids by interfering with the nasal circulation and causing catarrh, and also interfering with the ocular circulation, produce a hyperemia and disturbance of the choroidal pigment readily discernible with the ophthalmoscope, and that amblyopia may frequently be relieved by timely removal of the adenoid hypertrophy.

POST OPERATIVE OCULAR COMPLICATIONS OF ORAL ORIGIN.

It has been the experience of all operators to have a continuance of ciliary injection with photophobia, lacrimation, or even a gelatinous iritis, following a technically correct operation more particularly for cataract, in which no local condition or exogenous infection seemed responsible, to subside after extraction of an abscessed tooth. The literature is not without like reports. Thus Fox[19] records 2 cases in which postoperative suppuration was controlled and the eyeball saved by prompt and effective treatment of the dental lesion. In the presence of foci of infection these are removed and antitoxin employed before and after the operation.

Francis[20] had symptoms of infection occur two days after cataract extraction coincident with the development of tonsillitis. Usual modes of treatment failed but the use of mixed polyvalent staphylococcic vaccine was followed by distinct improvement. He regarded the ocular process embolic from the tonsils. De O'Barrio has noted in 6 cases after cataract extraction, vasomotor disturbance manifesting itself in alarming redness of the conjunctiva, immediately subside after the extraction of diseased teeth.

OCULAR SYMPTOMS DEVELOPING AFTER TOOTH EXTRACTION.

Gutman[21] saw, in a boy 12 years of age, bilateral exophthalmos with congestion of ocular and orbital tissue and death from purulent meningitis follow the extraction of a right upper molar. He believes that the septic process began in the alveolus, either from infection subsequent to the extraction, or from septic instruments. A second somewhat similar case in a woman 41 years of age is reported by the same author, death being due to thrombosis of the cavernous sinus. In a third case postneuritic atrophy followed the extraction of an upper molar, the inflammation extending by the way of the antrum. Bruner cites a case of blindness, and Woods[22] one of exacerbation of a uveitis following tooth extraction.

ROUTE OF IRRITATION AND INFECTION.

The opinion of a dental surgeon (Black) may be invoked to explain the ocular manifestation of reflex dental origin. He states the cause to be an irritation of a vital pulp of a tooth; usually of thermal origin, hot or cold, foods or drinks; or contact of a foreign substance where the pulp is exposed. He points out that an exposed pulp may be infected and yet remain vital or partially so for a long time. Pressure on the terminal branches of the

fifth nerve within the pulp chamber of the tooth excites the reflex.

The route of infection is either directly into the blood and lymph streams, or by extension of the septic process, either by way of the antral mucous membrane or by the periosteum. Brown and Irons consider that several factors are concerned; the periodic entrance into the blood streams of organisms from such foci, and their lodgment in the eye either by reason of their greater number as in sepsis or by fortuitous embolism, changes in the eye itself, either in vascular anastomoses or in susceptibility of the ocular tissues owing to previous injury; and finally, changes in the organism itself whereby it may become better able for a time to maintain itself in the tissues of the eye.

Rosenow[23] considers localization to the iris and ciliary body as not accidental; but that here there is a gradation from an abundant to a poor blood supply predisposing to the localization and growth of bacteria. Ibershoff[24] is correct in the main in stating that the ocular effects are manifested only after a long and variable time, and the progress is gradual and insidious.

The only experimental evidence is that supplied by Fisher, who succeeded in producing choroidal changes in a rabbit from cultures from diseased tonsils removed from a patient with chronic choroiditis.

It will be seen that uveitis is the type of ocular inflammation which most often is attributed to focal infection. But the structures here involved are those which are particularly susceptible to the toxemia of the bacillus tuberculosis and the spirocheta pallida; and, as Marple[25] has stated, there are no distinguishing peculiarities about an iritis from focal infection. As is well known, tuberculosis as a cause is most difficult to exclude; and, as was emphasized by Axenfeld, this difficulty does not end at the bedside but continues to the post mortem room and pathologic laboratory.

With syphilis it is different, as the weakness of the Wassermann test is in its negative phase and a strongly positive reaction leaves no doubt as to the active presence of the spirochete and its probable guilt, and if this is not conclusive we have remedies so potent against it that therapeutic proof can be soon added. It is needless to say that the mere presence of an abscessed tooth or a pyorrhea proves nothing. Here as elsewhere must other possible causes be eliminated. But even in their presence it must be demonstrated that treatment directed towards their removal failed, whereas the removal of the supposed source of infection alone brought cure.

In closing I should like to quote Herman Knapp who, according to Marple, once said, "We cannot reach a satisfactory conclusion on any subject until its boom has subsided," and in relation to this subject this period has not yet been reached.

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POWER OF THE EYE TO SUSTAIN CLEAR AND COMFORTABLE SEEING WITH DIFFERENT ILLUMINANTS.

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In previous papers (1 and 2), a study has been made of the effect on the eye of differences in the way in which light is delivered to it from a given type of illuminant. In the work of the present paper a series of tests is begun on the effect of the illuminant itself. Eleven of the more common illuminants have been tested with the same conditions of installation, shading, etc., and a correlation has been made between the lighting effects obtained and the power to sustain clear and comfortable seeing.

INTRODUCTION.

The belief seems to prevail among laymen and not a few technical and medical men that the kerosene flame as a source of light possesses advantages for the eye not to be had by other illuminants, more particularly the incandescent solids. At one of the earlier meetings of the American Medical Association's Subcommittee on the Hygiene of the Eye, the belief was expressed and quite favorably received that of all of the common illuminants the kerosene flame gives the best light for the eye and that it should be taken as our model for hygienic lighting. An eminent ophthalmologist writes[3]: "It has been shown by experiment that the light which gives the maximum of illumination with the minimum of irritation to the eye is composed of the yellowish rays of the middle of the spectrum. For this reason the old fashioned candle and kerosene lamp have never gone entirely out of fashion." In a more recent article[4] in the same journal we find a section on "Simulating Old Illuminants," and in the last paper read before the Philadelphia section of the Illuminating Engineering Society a growing sentiment for the older illuminants was noted.[5]

Leaving out of consideration the many things that have been said in popular and semitechnical publications on the effect on the eye of the color value of light, of which subject we do not wish to make a special point prior to experimentation, these are only a few of the more familiar statements of opinion that may be cited in evidence that there is a need for testing the effect on the eye of the light of the older illuminants (more especially the kerosene flame) as compared with the more modern illuminants with the intensity, conditions of shading, installation and use, etc., the same in each case.

Two divisions may be made of this comparison: (a) with the illuminants compared used for the purpose of general illumination, and (b) with these illuminants adapted to local, reading table or desk lighting. In the first of these cases differences in result would perhaps be more apt to occur, because of the greater number and complexity of the factors present and the greater difference in difficulty in protecting the eye from unfavorable conditions relating to a set of factors which we have hitherto called the distribution factors. It is quite probable also that a comparative rating of illuminants made on the basis of local lighting, in which case it is not difficult, for example, to eliminate high brilliancies from the field of view, will not hold for general

lighting, in which case the chief difficulty seems to be to protect the eye from high brilliancies.

Because, however, of the greater difficulty in getting comparable installations for general lighting, we have chosen to make the first series of tests with local lighting given by a single unit, a one-burner student lamp of the standard type with modifications suitable for the different illuminants employed. We have been led to choose this particular type of unit in part because the belief in the superiority of the kerosene flame for the eye is in the minds of those we have questioned associated largely with the lighting effects given by the student lamp; and in part because this lamp is well adapted for the control of conditions under which we wish the first series of tests to be made.

CONDITIONS TESTED.

Two series of experiments were conducted. In the first series the illuminants tested were a kerosene flame; a 50-watt, clear, metallized filament (Gem) carbon lamp; a 15-watt, clear, "mazda, type B" tungsten lamp (round bulb); a 60-watt, clear, "mazda, type B" lamp; a 75-watt "mazda, type C" lamp; and a 75-watt "mazda, type C-2" lamp.* The kerosene flame (Lusterlite kerosene) was burned at a height of 3 inches and had a horizontal candlepower of 15.8. For the sake of comparison with the kerosene flame it might have been desirable to have conducted the tests with the other illuminants equal to it photometrically, or approximately so, as well as with an equally illuminated reading page and test object. This was, of course, impracticable in case of the "mazda, type C" lamps. For this reason two "mazda, type B" lamps were used,—one as nearly as possible equal in candlepower to the kerosene flame, the other to the two "type C" lamps.

In choosing the sources, care was taken also to have them all as nearly as possible of the same size or to have a check condition on this factor analogous to that described above; and to adjust the position of the lamp so as to sustain approximately the same relation to the shade. The bottom of the shade was, for example, in each case 2.5 cm. below the center of the luminous source.

The lamp was placed behind and to the left of the observer in the position that was judged by several observers to give the most favorable conditions for reading. This position may be roughly specified as follows: The angle with the median plane of the observer made by a plane passing vertically thru the center of the unit was approximately 21 degrees; and the line in the latter plane connecting the bottom of the shade with the center of the reading page formed an angle of approximately 38.5 degrees, with the horizontal plane passing through the center of the reading page. The reading page was supported by a rack fastened to the upright to which was attached the mouth-board used by the observer in taking the 3-min. record before and after work. This rack was inclined at an angle of approximately 30 degrees with the vertical. To insure that the same amount of light fell on the reading page in each case, the brightness of the page was measured before and after work by means of a Sharp-Millar illuminometer, with the test plate removed and calibrated to give readings directly in candlepower per square inch.

The changes needed to give equality of illumination on the reading page were made by changing the distance of the lamp from the page. These changes in case of the first three illuminants were very small. For the remainder, owing to the greater difference in the candlepower of the lights used, the equalization required that a greater difference in the distance of the lamp from the reading page be employed. This meant a slightly greater difference in the amount of general illumination given and a slightly

*Trade definitions: Gas-filled, *daylight* (blue) glass incandescent lamp—Mazda C-2. Gas-filled, clear glass incandescent lamp—Mazda C. Vacuum, clear glass incandescent lamp—Mazda B.

greater difference in the brightness of the surroundings. That is, the lamps of higher candlepower, placed at a greater distance from the reading page, illuminated a larger field than the lamps of lower candlepower. In making these changes of distance care was taken to keep the angle at which the light fell on the page in all cases the same. Some difficulty was given also by the difference in the length of the lamps employed. For example, the long stems of the "type C" lamps made it necessary that the shade be raised if the filaments were to have approximately the same position in the shade as were had by the kerosene flame and the filaments of the shorter lamps. To take care of the needed adjustment in the height of the shade an extension shade holder was used.

Owing to the angle of direction of the light and the distance of the lamp, the test object had to be illuminated from a separate source. For this a "mazda, type B" lamp and an Ivanhoe-Regent steel reflector of the intensive type, aluminum lined, were used, placed in front and to one side of the test object at the distance and angle needed to give the required illumination. In order that the test object alone should be illuminated and not the surrounding wall, objects, etc., the opening of the reflector was covered, and an oblong aperture was cut of the size and shape needed to give the cross section of light desired. The position of this aperture in the opening of the reflector was chosen with reference to giving the most even illumination of the test object. That is, the light was not taken directly from the lamp but from the most favorable part of the inner surface of the reflector. The test object was made to match the reading page both in brightness and color value.

The match in color value was secured by means of thin gelatin filters covering all or a part of the aperture. If only

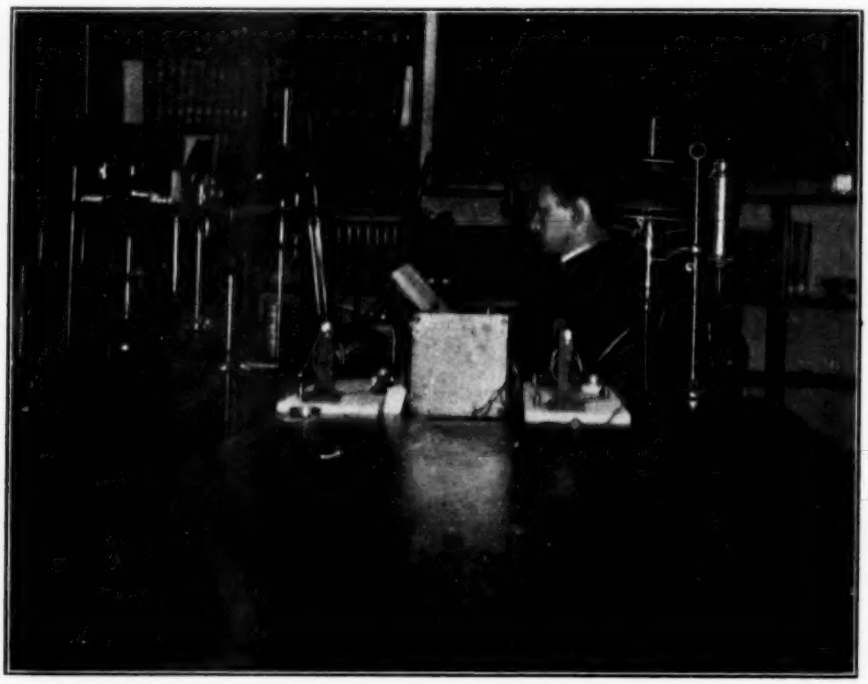

FIG. 1.

Test Room showing position of source of light (student lamp) reader and page, in measuring the power of the eye to sustain clear and comfortable vision.

a part of the aperture was covered, the filter was used as a diaphragm with an opening similar in shape to the original aperture. There was, for example, enough difference in the color value of the illuminants that without this match a colored after-effect was given, distinctly different from the reading page. This would have necessitated that the final 3-min. record be taken in part at least with a test object having a coloration complementary to the reading page, which would not have been compatible with the purpose of the test. Before beginning each test of the series, the eye was allowed the customary adaptation period without work under the illumination to be tested. The choice of the length of adaptation period was empirical, based on a series of acuity tests, the object being to determine a period the prolongation of which gave no further change in acuity.

In the first series of tests with the illuminants mentioned above, the ordinary green shade of the student lamp was used. However, as the work progressed, the results seemed to indicate more and more clearly that difference in color value must be added to the list of factors which are considered to affect the power of the eye to sustain clear seeing for a period of work. In fact, as the tests were conducted, color value was the only variable of any magnitude present from series. In any event it was considered advisable to repeat the tests with the color value proper to the illuminant, unmodified by the light which filtered thru the shade, even tho the position of the lamp was such that a very small part of the light which fell on the reading page was of this origin. From this time on, therefore, an opaque shade of the same size and design and with a neutral lining was substituted for the green shade. The results for the neutral shade only will be given in this paper, altho no significant difference in result between the green and the neutral shade was found.

The reading page illuminated by the different lights had the following color values: the "mazda, type B" lamp, an unsaturated reddish yellow; the kerosene flame, reddish yellow with a greater proportion of red and more saturated; the carbon lamp, reddish yellow with less red than the kerosene flame and more than the "type B" lamp; the "type C" lamp, unsaturated yellow, nearly white; and the "type C-2" lamp, noticeably bluish. These estimates of color value are based in part on a direct comparison, in part on the filters that had to be used, to make the color match between the test object illuminated by the "type B" mazda lamp and the reading page lighted by the illuminant to be tested. We have not as yet made a standard colorimetric or spectrophotometric comparison.

The tests were conducted in a room 16 ft. 6 in. (5.03 m.) long, 11 ft. 9 in. (3.58 m.) wide and 9 ft. 6 in. (2.98 m.) high. A photograph of the room with an observer, lamp and recording apparatus in position is shown in Fig. 1. The recording apparatus and the fixtures for lighting the test object are, it will be noted, screened from the observer's view.

In the selection and use of observers for all of our work care has been exercised in the first place to choose only those who had already shown a satisfactory degree of precision in other work in physiologic optics and whose clinic record showed no uncorrected eye defects of consequence. All have been under 30 years of age. Before being allowed to take part in the actual work of testing, each observer was trained to a satisfactory degree of precision in the 3-min. records under a given lighting condition and in the 3-hour test under several conditions. In the actual work of testing, the results were compiled from a number of observations and the precision was checked up by the size of the mean variation. No results were accepted as significant unless the variation produced by changing the condition to be tested was largely in excess of the mean error or mean variation for each condition tested. This, the accepted check on the influence of variable extraneous factors in work of this kind, was carefully applied at each step in the work. A fuller statement of the precautions that have

TABLE I.

Showing the tendency of the different illuminants used to cause loss of visual efficiency, or power to sustain clear seeing.

Type of Illuminant	Dominant Color	Brightness (cp. per sq. in.) Test object	Brightness (cp. per sq. in.) Reading page	Time	Working distance (cm.)	Total time clear (sec.)	Total time blurred (sec.)	Total time clear ÷ total time blurred	Ratios reduced to common standard	Loss of efficiency expressed in percentage change of ratio	Mean variation (per cent.) Based on 3.5	Mean variation (per cent.) Based on result sought (drop in ratio)
Mazda lamp, Type C	Unsaturated yellow, nearly white.	0.003168	0.003344	9 A. M.	60	144.27	35.73	4.038	3.50	5.34	0.19	3.58
				12 M.	60	142.67	37.33	3.822	3.313	....	....	....
Mazda lamp, Type B, 60 W	Unsaturated yellow, slightly reddish.	0.003168	0.003344	9 A. M.	60	139.0	41.0	3.39	3.50	6.86	0.43	6.25
				12 M.	60	136.7	43.3	3.157	3.26	....	....	....
Mazda lamp, Type B, 15 W	Unsaturated yellow, slightly reddish.	0.003168	0.003344	9 A. M.	60	138.6	41.4	3.348	3.50	7.11	0.503	7.07
				12 M.	60	136.2	43.8	3.11	3.251	....	....	....
Carbon lamp (metallized filament).	Reddish-yellow	0.003168	0.003344	9 A. M.	60	142.5	37.5	3.80	3.50	7.89	0.371	4.71
				12 M.	60	140.0	40.0	3.50	3.224	....	....	....
Kerosene flame	Orange-Yellow	0.003168	0.003344	9 A. M.	60	139.17	40.83	3.408	3.50	8.39	0.323	3.84
				12 M.	60	136.33	43.67	3.122	3.2063	....	....	....
Mazda lamp, Type C-2	Unsaturated blue	0.003168	0.003344	9 A. M.	60	138.75	41.25	3.364	3.50	13.14	0.60	4.57
				12 M.	60	134.12	45.88	2.923	3.04	....	....	....

TABLE II.

Showing a comparison of the tendency of the different illuminants used to cause loss of visual efficiency and to produce ocular discomfort. The tendency to produce discomfort is estimated by the time required for just noticeable discomfort to be set up.

Type of Illuminant	Dominant Color	Brightness (cp. per sq. in.) Reading page	Per cent loss of efficiency	Mean variation (per cent)	Time threshold of discomfort in seconds (reading)	Mean variation (per cent)	Change produced by changing type of reflector (per cent)
Mazda lamp, Type C	Unsaturated yellow, nearly white	0.003344	5.34	0.19	116.5	1.30	....
Mazda lamp, Type B, 60 W	Unsaturated yellow, slightly reddish	0.003344	6.86	0.43	98.5	1.53	15.45
Mazda lamp, Type B, 15 W	Unsaturated yellow, slightly reddish	0.003344	7.11	0.503	98.5	0.51	0
Carbon lamp (metallized filament)	Reddish-yellow	0.003344	7.89	0.371	93.0	0.72	5.58
Kerosene flame	Orange-yellow	0.003344	8.39	0.323	90.0	1.11	3.23
Mazda lamp, Type C-2	Unsaturated blue	0.003344	13.14	0.60	54.5	3.70	39.44

been used in this and previous work to secure reproducibility of results has been given in various places in preceding papers.[6]

The results for the effect on the eye are given in Table I. The values given in this table are averaged in each case from the results of a number of three hour tests. In order to show the reproducibility of the results obtained and to determine whether the variations produced by the changes in lighting effects are safely in excess of the variations in the test itself, subject to all of the variable factors which may influence it, the mean variation from the average result has been computed in each case. The value of these in per cent is given in columns 12 and 13 in Table I. This value has been estimated in two ways. In column 13 it is based on the result sought, namely, the mean value of the drop in ratio of time seen clear to time seen blurred. Computed in this way the results indicate whether or not each individual determination has been made with an acceptable degree of precision as compared with other work of its class. In column 12 it is based on 3.50, the value of the ratio time clear to time blurred, which has been chosen empirically as the standard of performance of the eye in the 3-min. record before work. Computed in this way, the results appear in a form from which it can readily be determined whether or not the work has been done with a degree of precision which is acceptable for the comparative work which is the special purpose of these experiments. That is, to be acceptable in this regard, the variations of the drop in ratio caused by changing the conditions to be tested, must in each case be safely in excess of the mean variation. To make this comparison convenient, the drop in ratio and the mean variation have both been estimated in per cent on the same base, 3.50.

In Fig. 2 a graphic representation is made of the results of Table I. In constructing this chart the total length of the test period is plotted along the abscissa and the ratio of the time the test object is seen clear to the time it is seen blurred is plotted along the ordinate. Each numbered division shown along the abscissa represents one hour of the test period; and along the ordinate, an integer of the ratio.

In former papers another method of evaluating the results of the test was employed in addition to the one used above. In this method the ratio of the time seen clear to the total time of the observation is taken as the measure of the eye's ability to sustain clear seeing at the time the test was taken. For the sake of again comparing this method of evaluation with the one used above, a chart has been prepared (omitted from this paper because of lack of space) in which the ratio of time clear to total time of observation is plotted against length of test period. A comparison of this chart with that given in Fig. 2 shows the same order of rating of the illuminants, but a slight difference in the position in the scale given to some of them. For the purpose of discovering what is the best way of treating the

(1) The data given in this paper were obtained from the observer whose results have been given in the preceding papers on the effect of different conditions of lighting on the eye. In case of the present paper we have not as yet, for lack of time, been able to check up these results with those obtained from other trained observers. We have, however, in the work on the distribution factors always found the results of this observer to be typical of the group of observers used. Whether or not this will be the case for work in which the distribution factors are not the sole or principal variable, remains yet to be determined. In this regard it is perhaps only fair to say that the characteristics of response of the eyes for which these results are given, have been very widely investigated. They have been chosen especially for their normality and practiced precision of behavior, and have been used in these experiments under conditions of control based on a very unusual and widely tested knowledge of the factors which influence their steadiness of response. Data on their characteristics of response may be found in more than forty articles. Their spectral luminosity curve, for example, agrees very closely with the average curve obtained by Nutting for 18 observers.[5]

The results of the above tests are now being checked up on other trained observers.

results of the tests, several methods have been employed. Up to and including the present paper, however, only three of them have been given in print: ratio of time clear to time blurred, ratio of time clear to total time of observation, and the per cent drop in the ratio time clear to time blurred.[1] An ultimate decision with regard to what is the best method of treating the results has not yet been reached and determinations were made and a discussion of the method that was used has been given in a previous paper. The results are shown in Table II. In this table are given, also, for the sake of comparison, results expressing the tendency of each type of illuminant to cause loss of ability to sustain clear seeing.

The results of this work, so far as it has been carried, more particularly

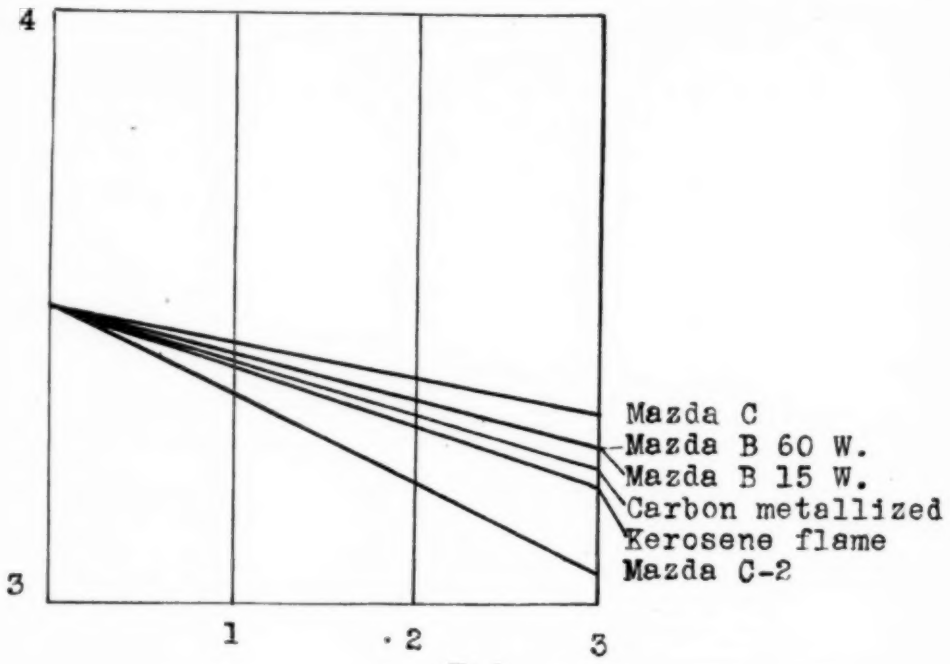

Fig. 2.

Graphic representation of results of Table 1, each numbered division at the bottom represents one hour of the test period. The lines start from the assumed base of 3.5, showing loss in ratio of time clear to time blurred.

for the purposes of this work is perhaps not necessary. From the data given any one of them may be used.

As formerly, the work was concluded by determining for the different illuminants used the relative tendencies to produce ocular discomfort with the eye at work. A description of how the those to be presented in a later paper which cover a range of color values greater in amount and apparently more significant in direction, seem to indicate that the tests for the effect of color value of light on the power of the eye to sustain clear and comfortable seeing should be carried further. In the work

(1) A comparison of this chart with those of the preceding papers shows that the order of magnitude of loss in power to sustain clear seeing for the kerosene flame and the Type B mazda lamp (student lamp unit), was about the same as for the best of the opaque inverted reflectors (Type B mazda lamp); and for the Type C-2 lamp as for the best of the translucent inverted reflectors. The effect for the Type C mazda lamp was slightly better than for the best of the opaque inverted reflectors.

so far we have found that in case of a given color this power decreases with increase of saturation of color; but that independent of saturation some colors affect the eye more than others. The worst effects thus far have been obtained with colors towards the short wave-length end of the spectrum. The reading of black letters or other characters on a page which presents any considerable degree of coloration is a peculiarly baffling experience. There is an unclearness which is not the blurring of bad focusing or of faulty fixation, but which seems to be a matter of the ease or, rather, lack of ease, with which the details of the retinal picture are discriminated. Unclearness or difficulty of discrimination from any cause whatsoever leads reflexly to muscular effort towards a corrective readjustment which of course in the cases under consideration comes to naught and only induces fatigue. The effect of color value of light on the power of the eye to hold itself up to a satisfactory standard of performance thru a period of work should, we believe, receive attention.

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VERNAL CONJUNCTIVITIS.

EDWARD JACKSON, M. D., F. A. C. S.

DENVER, COLO.

The report of a typical case followed thru several years, including the histologic examination of excised tissue, with statistics regarding 44 cases and some application of observed facts to diagnosis and treatment. Read before the Third Colorado Ophthalmological Congress, Aug. 10th, 1917.

Vernal conjunctivitis was described by Saemisch as a distinct clinical entity in 1876, and had been noticed by Arlt thirty years before that. Attention was called to it in the American literature by Burnett in 1881, and in 1886,[2] and in 1895[3] Gradle pointed out the frequency and importance of the palpebral form. In 1903 Posey[4] reported a collective investigation regarding this disease in America. It has been well described in every complete text book on ophthalmology published in English in the last twenty years, and occasionally discussed in medical societies. Yet it is a more common condition than is usually appreciated and is often not recognized, but treated as trachoma to the harm rather than the benefit of the patient.

This paper deals with the aspects of the disease which should lead to its recognition and appropriate management. It is based on 44 cases, notes of which have been taken in Denver in the last 15 years. Ten years previous acquaintance with the disease in Philadelphia seems to indicate that it is more common in the dry elevated region of the Western United States.

Let us consider the history of a typical case in detail. The symptoms on which the diagnosis should be based, the differential diagnosis from other conditions, and finally the treatment and the directions in which further study of it seems to promise most.

TYPICAL CASE.

CASE 1.—R. B., male, aged 15, was first seen May 25th, 1911. Eyes weak

after measles at 19 months, but recovered. When 7 years old he had adenoids removed, and took whooping cough which lasted from spring to fall. In August the present trouble with his eyes began, diagnosed as simple granulation of the lids. It recovered under treatment, except "a spot the size of a pin head." This was treated with silver nitrat, blue stone and clipped off, but would reappear. Glasses were tried, but discarded. An oculist who saw it in consultation said it was in the nature of a wart.

The boy had previously lived in El Paso, Texas, but in 1907 removed to central California. There he was treated with blue stone and silver nitrat; and glasses were tried again and worn for several months without benefit. Later the electrocautery was resorted to and deep curretting. The diagnosis of trachoma was broached, and tuberculosis also considered. The boy suffered from diphtheria and scarlet fever, which aggravated the trouble. Reports from Dr. Ophuls, the pathologist of the Cooper Institute of Bacteriology were negative for diphtheria or tuberculosis, but another consultant again suggested tuberculosis, and tested for the tuberculin reaction. Papilloma and fibroma were other diagnoses.

At this time one-third of the palpebral surface of the upper lid was occupied by a tumor consisting of firm granulation tissue on the borders, the center being made up of hard tissues like soft cartilage. The greatest thickness of tumor was 3 or 4 mm. The growth was removed and its site treated with silver preparations, until the lids seemed free from granulation tissue. Not long after new growths formed which were more vascular.

At the age of 13 he fell under the care of a San Francisco oculist, who treated him with blue stone and silver nitrat. A year later, under the advice of another oculist of international reputation and experience, the growths were treated with lactic acid for about ten months. Again, to eliminate the possibility of tuberculosis, the pathologist of the Medical Department of the University of California was called in, found the inoculation of the rabbit proved negative and reported: "The specimen consisted of soft tissue about the size of a pin's head. Fixed in formalin, sectioned in celloidin and stained in hematoxylin and eosin, the preparation gave the following microscopic findings: The preparation is made up of a lobulated mass, the periphery of the separate lobules is composed of epithelial cells, cuboidal in type and arranged in several indefinite layers. The parenchyma of the lobules is composed of fibrous tissue moderately rich in blood vessels. The nuclei in the fibrous element of the parenchyma are spindle-shaped and take the stain deeply, speaking for structure of some age. No evidence of malignancy. Conclusion: Fibroma."

PRESENT CONDITION.—All the lids were slightly thickened, the upper drooping. There was no hyperemia on the sclera, no thickening at the limbus. Eversion of the lids showed on the right the nasal third of the palpebral conjunctiva smooth, thickened, quite gray, the remainder covered by a pavement of hard masses, 2 or 3 mm. across, with furrows 1 mm. or more deep between them; somewhat pedicled; worse along the posterior edge of the cartilage, swollen and more separated toward the free margin of the lid. The left lid showed similar masses on the nasal one-third, which were, however, more hyperemic, smaller, and more separated. But all the masses were rather pale and insensitive.

The ophthalmoscope showed the media clear, and ocular fundus normal. Correcting lenses:

Right $+2.\bigcirc -0.75$ cy. ax. 100°

Left $+1.25\bigcirc -0.50$ cy. ax. 70°

were prescribed of medium amber glass for constant use. Under cocain two-thirds of the granulations, all the larger ones, were removed with scissors, without pain. Immediately the thick, ropy, yellowish discharge diminished, and the eyes became more comfortable. He was placed on

Tannic acid .....grains 3
Glycerin .....grains 30
Aqua rosae.....one fluid oz.

To be used 5 drops in each eye twice daily.

He continued the use of his eyes in school with comfort and gradual improvement.

1917-5-16. He returned feeling that his glasses no longer fitted. He had been studying hard at the university during the past year, including Latin and Greek. Upon everting the upper lids a few masses 1 to 3 mm. in diameter were found under each upper lid, and were snipped away. Next day the eyes were entirely comfortable and free from hyperemia except at the edge of wound of excision. He was given correcting lenses of dark Crookes' glass for outdoor use, and light for indoors. His correcting lenses were:

Right $+1.75 \bigcirc -2.$ cy. axis 100°
Left $+1.75 \bigcirc -1.$ cy. axis 82°

These gave vision of 1.3.

The excised masses were submitted to Dr. Wm. C. Finnoff, whose subjoined report may be compared with that of Dr. Lee above quoted, regarding the specimen examined seven years before.

"Three small plaques from the conjunctiva were submitted for examination, and were fixed in formalin, specimens were embedded in cellodin and stained with hematoxylin and eosin and with von Gieson's stain.

"Microscopic examination.—The surface of the plaques is covered with from one to five layers of epithelial cells. Fingerlike processes, lined with two or three layers of epithelial cells, extend down between the papillae.

"The epithelial covering of some of the papillae is thinned to one layer. Covering the thin epithelium is an exudate of fibrin in which are enmeshed numerous eosinophilic leucocytes, degenerated epithelial cells, polymorphonuclear leucocytes, and lymphocytes.

"In the stroma of the papillae there are small spindle shaped and large oval fibroblasts plasma cells, lymphocytes, polymorphonuclear leucocytes and numerous eosinophiles. The fibrous tissue in some areas makes a very thick, dense membrane for the epithelial cells to rest upon. In this connective tissue several eosinophiles can be seen.

"Several sections contain lymph follicles just under the epithelium of one of the papillae.

"The stroma of the papillae becomes more dense as the base is examined, and in one of the sections the base of the specimen contains a well developed connective tissue core."

This case illustrates rather fully the uncertainty regarding the diagnosis of this condition, on the part of ophthalmologists. Ten of them and two pathologists failed to relieve the patient either of uncertainty as to the nature of his trouble, or the burdensome and useless treatment. And it emphasizes the fact that severe and burdensome treatment is useless. During the six years this patient has been under observation without other treatment than the mild collyria and tinted glasses, he has been much more comfortable; and has completed his work in high school and two years of college, with gradual improvement of the condition of his eyes.

SYMPTOMS:

Of individual symptoms the *pericorneal hypertrophy* first attracted attention in this country, giving its title to the article of Burnett. It is not constant. In a few cases it is very striking, forming a thick mass unmistakably pathologic, and sometimes extending entirely around the cornea. More often it only involves part of the limbus, the temporal or the nasal portion by preference; but sometimes involves other parts even tho the temporal and nasal regions are free from it.

It becomes hyperemic and thicker during the warm part of the year; but if at all marked it disappears very slowly. It is composed of dense opaque fibrous tissue, as well as thickened epithelium; and has a slightly wavy or irregular inner border rising abruptly from the cornea. This kind of thickening was present in 14 of the 23 cases that showed lesions of the eyeball. It was first emphasized and studied by Reymond.[5]

The cornea itself is rarely involved, but in two of my cases this occurred.

CASE 2.—J. R. P., male, aged 20, has for 10 or 12 years suffered from sore

eyes, that grow worse each year in the spring. Severe hyperemia of the eyeball without much thickening of the limbus. In the lower half of each cornea is a semicircle of moderate opacity affecting the region usually involved in arcus senilis. The opacity is about 2 mm. wide, and separated from the scleral margin by a strip of clear cornea ½ to 1 mm. wide. The upper halves of the corneas are clear. The opacity is seated in the corneal parenchyma. This patient was seen but twice.

CASE 3.—H. C. E., male, aged 32, was first seen 1905-4-8, suffering from "hay fever eyes," complaining "strings of matter form under the upper lids, and scratch and irritate the eyes, which feel better on cloudy days." There was hyperemia of the bulbar conjunctiva, as well as involvement of the lid portion, showing the usual skim milk film, enlarged papillae and a few large flat growths. He was seen from time to time, always between April and September, the eyes giving no trouble the rest of the year.

1915-9-3. He had suffered especially for three weeks, complaining of the burning, the redness and "the stringy stuff." His sight had been affected, getting a little worse each year for the last few years. Vision with correcting glasses is R. 0.3; L. 0.66. It is always cleared up by December. The corneal reflex is found irregular. The cornea hazy. There is moderate pericorneal hyperemia, and pavementlike thickening of the whole palpebral conjunctiva.

1915-9-9. Vision is as before, roughening of the corneal surface more marked. No staining with fluorescein.

9-15. He was slightly better. Vision, right 0.5; L. 0.7. Under use of adrenalin and an ointment of salicylic acid, 1:120.

9-21. The first frost of the season occurred this morning. Vision R. 0.7; L. 0.9. Eyes are much more comfortable. Can see to read the paper, the first time for three weeks. Cornea smooth and clear, thickening of the palpebral conjunctiva rather less.

9-29. Lids still smoother.

10-18. Corrected vision R. 1.2; L. 1.2. Lids almost smooth and normal. Eyes quite comfortable.

More frequent than the above, being seen in 23 of the 44 cases, is a temporary *hyperemia of the bulbar conjunctiva* when not accompanied by thickening. This was only seen during the warmer parts of the year, and was often developed chiefly after rubbing the eyes. In many cases the bloodshot appearance was most complained of.

CASE 4.—F. B. D., a Pullman car conductor, carried in his pocket a bottle of adrenalin solution to use several times a day to control this symptom; and other patients have resorted to adrenalin to make their eyes presentable for special occasions.

Hyperemia of the palpebral conjunctiva is present in the majority of cases, and is always found in those of recent origin. In the more severe and chronic cases it may be absent, or masked by other changes in the lid. It tends at first to be uniform over the whole inner surface of the lid, and to a slightly purplish red color.

The *gray film* on the palpebral conjunctiva, which has often been compared to a thin layer of milk upon the surface, was first emphasized and described in detail from Horner's Clinic by Vestch[6] (Inaug. Dis. Zurich, 1879). It varies from an unmistakable hiding of the deeper tissues to the slightest veiling perceptible against a uniform rather purplish background of hyperemia. It is not constantly present, according to my experience, and was noted in but 17 of my cases.

Roughening of the inner surface of the lids was present in but 28 of the 44 cases. It is of two kinds. More common, is slight irregularity such as might be due to slightly enlarged papillae, and which I note as "papillary." In the second form we find larger protruding masses often with a contracted neck or pedicle, which have sometimes been compared to the circumvallate papillae of the tongue, and sometimes to a cobblestone pavement. When very numerous these become irregularly hexagonal by mutual pressure. They are of slow development, may continue with little change from year to year, and are of firm consistence. They are

never soft and dark-red like the masses sometimes seen late in gonococcus ophthalmia; but rather pale yellowish, and of even cartilaginous consistence. Such granulations were present in 14 cases. They may remain but little altered for many years, and cases presenting them have generally been regarded by some who treated them as cases of trachoma.

Noticeable *discharge* is not always present; but it is often a persistent and most annoying symptom. It was noticed in 14 cases, generally when there were large masses of hypertrophy on the palpebral conjunctiva. It is described as stringy, adhesive, always consistent, sometimes even cheesy, masses. Rarely, if ever, is it thin and watery. It may be almost colorless, but is more often a yellowish white color.

The *subjective symptoms* are generally slight and unimportant except the form of irritation that is usually described as itching, and often causes a strong inclination to rub the lids. Itching was especially noted in 19 cases.

The annoyance from the strings of discharge which form and are difficult to get rid of, is a frequent cause of complaint. *Photophobia* may be annoying, but sometimes is not noticed. But the eyes feel "weak" and there is a strong disposition to avoid their use.

Two points that have an important bearing on the diagnosis are the *season of the year* at which the attacks appear, or become aggravated; and the age of the patient. With reference to the seasonal prevalence of the disease, my cases first applied for relief as follows:

January	1	July	3
February	1	August	5
March	5	September	5
April	6	October	4
May	5	November	0
June	9	December	0

The patient seen in January was not suffering at the time, but said that for many years his "eyes had looked like a beefsteak from August until frost." The patient seen in February had suffered from the trouble for years; and like some of those seen in March, sought to forestall a new attack. Of the patients seen in October, 2 had suffered from the trouble for years, and 2 had been much worse during the spring and summer. No case seemed to arise between September and March.

As to *sex*, I find that 25 of the patients were males, 19 females, a preponderance of the former that might easily be accounted for by more general exposure to light and dust.

With reference to the *age* of the patients: At the time of the first attack the best obtainable history indicated that it was:

Under 5 years	3
5 to 10 years	15
10 to 20 years	13
20 to 30 years	9
30 to 40 years	2

The following case indicates that it is possible for the disease to start late in life, altho such an occurrence must be very rare.

Case 5.—Mrs. S. A. A., aged 75, was first seen for incipient nuclear cataract, which still permitted corrected vision of Right 0.7 and Left 1. She gave no history of previous symptoms of vernal conjunctivitis; but presented papillary granulations of the palpebral conjunctiva, covering a portion of each upper lid. These appeared in August, with hyperemia and feeling of a foreign body. The larger masses were yellowish in color. The irritation occurred three successive summers. There was no involvement of the region of the limbus.

The repetition of the attack or exacerbation each summer commonly goes on for several years. Only eight of these patients were seen in the year of the first attack. Most of them were not cured when last seen, but when last seen the attacks had continued to recur:

Less than 5 years	19
5 to 10 years	13
10 to 15 years	4
15 to 20 years	6
Over 20 years	2

DIAGNOSIS.

Most cases of vernal conjunctivitis have at some time been mistaken for trachoma, and trachoma is such a varied, multiform disease that there is reason for liability to this error. Both trachoma and vernal conjunctivitis are inflamma-

tions affecting the conjunctivas of the lids and globe, and running a course measured in years. Both are marked by swellings spoken of as "granulations" on the palpebral conjunctiva, and possible extensions of the lesions on to the cornea. But with these points of similarity there are others of essential difference that will lead to a correct diagnosis if they are borne in mind and looked for.

Trachoma begins insidiously, becoming manifest at any time of year. Vernal conjunctivitis begins with a fairly distinct exacerbation in the spring or during hot weather. The relapses or recurrences of trachoma arise at any season, following ordinary conjunctival irritants. Those of vernal conjunctivitis are closely related to warm weather. The granulations of trachoma are deeply situated in the conjunctiva, or beneath it in the deeper tissues. Those of vernal conjunctivitis arise on the surface, and extend out from the normal surface, being often slightly pedicled. In trachoma they are apt to involve the retrotarsal folds. In vernal conjunctivitis they are almost exclusively situated on the tarsal portion of the upper lid, being most developed near the posterior edge of the tarsus. The skim milk film of vernal conjunctivitis is not seen on the lids in trachoma, nor are the scarred lids, or altered tarsus of trachoma seen in vernal conjunctivitis, unless caused by improper treatment.

In vernal conjunctivitis the involvement at the corneal margin consists in a thickening of the limbus, most likely to be marked at the temporal or nasal portion. If other parts of the cornea are involved they present slight irregularity of surface, and nonvascular general haziness. In trachoma the usual corneal lesion is a clouding and superficial vascularity affecting the upper and lower portions of the cornea, these come most constantly in contact with the lids.

In trachoma the discharge is proportioned to the acuteness of the process, or depends on intercurrent inflammations. In vernal conjunctivitis the discharge is proportioned to the size of the granulations and has a peculiar character. It is stringy, ropy, even almost cheesy in consistence, rather than purulent. In trachoma microscopic examinations may show the inclusion bodies, or the microorganisms of various forms of infectious conjunctivitis. In vernal conjunctivitis overgrowth of epithelium sometimes arranged like a papilloma, and increase of eosinophiles are the characteristic changes.

As to confusion with other conditions, such as tuberculous conjunctivitis, Parinaud's conjunctivitis, chronic diplobacillus conjunctivitis, etc., any mistake of diagnosis will be easily avoided if the clinical characteristics of vernal conjunctivitis are borne in mind and the history of the case is considered.

TREATMENT.

The correct diagnosis of vernal conjunctivitis is of practical importance because of the totally different line of treatment that should be pursued for it, from what is commonly required for trachoma, or the other conditions with which it is likely to be confused. For the latter painful and irritating applications and serious operations are appropriate. But for vernal conjunctivitis the only operative treatment indicated is the excision of any large masses found on the tarsal conjunctiva of the upper lid.

Local applications should generally be relatively mild or soothing. Solutions of tannin or ichthyol, one per cent or less; one per cent ointment of the yellow oxid of mercury, solutions of boric acid 3 per cent; sodium hyposulphit or potassium chlorat, one per cent or less, or quite weak solutions of adrenalin, are to be used. These relatively mild applications contribute to the comfort of the patient and do quite as much toward shortening the course of the disease as any more active and painful line of treatment.

Probably for a radical cure, where such treatment is available, repeated exposures to the Roentgen-ray, or to radium, are our most valuable therapeutic measures. With reference to the latter Allport[7] states that of at least fifteen cases treated with X-ray exposures in a dozen years "they have all been cured, that is, all who have carried the treatment thru to the end."

Butler[8] has obtained equally conclusive results through applications of radium and Mackenzie-Davidson, who applied

the treatment for him, stated that "all of the cases which he had treated thus had been completely cured."

For prophylaxis or the prevention of recurrences, residence in a cool, moist climate during the hot portion of the year has proven reliable. Such a climate is found on the coast of Maine, among the lakes of Canada and the northern United States, and in the region of Puget Sound or Alaska. It may be found in some mountain climates, but apparently it is quite as important to avoid dryness of the atmosphere as to avoid heat.

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DISCUSSION.

Dr. W. A. Sedwick, of Denver, demonstrated three cases of vernal conjunctivitis. The first was a boy of thirteen years who had had more or less trouble for six years, but had become a great deal worse two years ago. The condition came on in the spring, with itching, burning and redness. It was a little better in the middle of the summer and still better in the winter. Little benefit had resulted from treatment until copper sulphat was used; since then there had been marked improvement. The second case was in a boy of ten years, whose first complaint had been three years earlier following an attack of measles. The condition had started in the late winter, was better in the summer following treatment, but always considerably better in the winter. There were large granulations inside the upper lid at the inner canthus. A third case of similar character was also shown.

Discussion — Frank R. Spencer, Boulder, Colorado, said that it seemed to him there had been an epidemic of vernal conjunctivitis this summer. He had seen three or four times as many cases as in previous summers. He called attention to a paper by Allport in the Ophthalmic Record, v. 26, p. 395, on the use of X-ray treatment.

Harold Gifford, Omaha, Nebraska, said that in a personal communication, Allport had stated that of late he had been using radium instead of the X-ray, and had been getting just as good results with less trouble.

So far as Dr. Gifford knew, there had not been any previous report of acute vernal conjunctivitis starting in adult life; but he had seen one case in which during the fearfully hot summer of 1901, a middle aged woman suddenly developed all the symptoms of vernal catarrh, including a typical waxy tarsal conjunctiva, with much sensitiveness to heat, the condition persisting during the summer and disappearing with the advent of cool weather. It was possible that this might have been a latent case of long standing, stirred up by the heat, instead of a new case. During the same summer, he had seen two other cases in adults, which ordinarily would have been called fresh cases; but he happened to have treated both of them many years before for mild vernal catarrh, which was apparently cured by adrenalin. During intervening years, they had no trouble whatever, but the unusual heat of 1901 stirred up the old symptoms with increased vigor.

Melville Black, Denver, would like to ask how many of the men present thought that the condition of the eyelids of the older boy warranted a diagnosis of vernal conjunctivitis. Some of these cases were just as bad in the winter as in the summer. The boy had improved under the use of bluestone, but it was far from being a typical case of trachoma.

Marcus Feingold, New Orleans.—The older boy presents the typical picture of vernal conjunctivitis, but in the histologic picture in the portion examined by Dr. Finnoff the usual dipping down of the thickened epithelium so characteristic of the disease is missing. If unusual heat were to be the cause of this conjunctivitis, as has been asserted, New Orleans with its long summer should show a great deal of vernal conjunctivitis, but it is characteristic of our city that no vernal conjunctivitis is seen, or only in abortive cases. About four years ago Bayer of Freiburg, reported experiments in which he hermetically closed the eyes by transparent glass or celluloid capsules; these allowed light to pass thru but prevented the access of air. In all experiments the patient experienced relief from the subjective symptoms. I repeated the experiment in two cases of the abortive type, as seen with us, with the very gratifying results that the subjective symptoms of itching and irritation disappeared while, of course, the objective symptoms remained unchanged.

H. H. Stark, El Paso, Texas. If heat and dryness produce vernal catarrh, there ought to be plenty of it in El Paso, Texas, but Dr. Stark had never seen a true case develop in El Paso. They did have at times a development of thickened conjunctiva opposite the palpebral fissure, but never the pavement formation.

E. N. Robertson, Concordia, Kansas. In our section (north central Kansas), as many of you know, it is not uncommon for the thermometer to hover around 100 to 105 degrees in the shade, continuously during the greater part of July and August, and during the last ten years, the only summer I do not recall having seen a new case of vernal catarrh was during the season of 1915, when it was very wet and cool from May to October. I have naturally, therefore, been led to associate this disease exclusively with the hot, dry weather. That it does occur in the cooler and damper climates cannot be denied, but I understand the type of the disease differs. It is said that in England and northern France, the tarsal type is prevalent, while in Italy and Mediterranean countries, the bulbar form is more common.

I take it there must be some form of hypertrophy, either on the ocular or palpebral conjunctiva, to make a typical case of vernal conjunctivitis. In practically all of the cases which I have been privileged to see, the socalled bulbar type has predominated, the jelly like band being present around the cornea with but slight, if any, thickening or hypertrophies of the tarsal conjunctiva. The extreme form of hypertrophy with large granulated bodies on the tarsal conjunctiva, such as were exhibited here today, I have never seen, although I remember examining cases of the tarsal variety in Omaha, while associated with Dr. Gifford some ten years ago.

In this connection, I wish to report a case diagnosed on my records as vernal catarrh, a typical form which for several years had been causing a charming young lady considerable grief during the spring and summer only. The itching, burning photophobia, lacrimation, and hyperemia started during the spring of 1911 and 1912, when the patient was about twelve years of age. It was a couple of years later, when she first consulted me. The objective symptoms at that time consisted of a slight ptosis, hyperemia, and mucous discharge. There were no hypertrophies on either the ocular or palpebral conjunctiva, the bluish white film could always be seen over the upper tarsal conjunctiva, and about once a day, beginning with hot weather, portions of a pseudomembrane would be cast off from the conjunctiva, and have to be swabbed from the conjunctival sac by the patient. If picked off during treatment, a raw surface would sometimes be left. The conjunctiva was not perceptibly thickened, as I recall. Microscopic examination of smears from the conjunctiva and mucous discharge revealed no specific organisms.

After seeing me a few times and being informed of the nature and course of the disease, the young lady was taken the following spring to the Mayo Clinic, where her condition was diagnosed as tuberculosis of the conjunctiva. After six weeks of antituberculous treatment, she returned home unbenefited by her stay at Rochester. She was then referred to Dr. Gifford, who confirmed the diagnosis of vernal catarrh, a typical form.

It may be of further interest to note that the young lady, now past eighteen years of age, returned to see me recently since the hot weather, with almost complete cessation of her eye symptoms, objective and subjective, except for a slight sleepy look in her eyes. The only treatment prescribed by both Dr. Gifford and myself was weak solutions of cocain and adrenalin, and cold applications.

Otis Orendorff, Canon City, Colorado, had been treating a case of vernal catarrh in which there was hay fever. The eye condition came and left with the hay fever, altho the eye condition was a typical vernal conjunctivitis.

W. A. Sedwick thought that if the case were one of trachoma, there would probably have been found some inclusion bodies and also pannus. The lids of his first case became entirely smooth afterward under local applications of fibrolysin.

C. A. Ringle, Greeley, Colorado, referred briefly to statements made by various writers on the subject of vernal conjunctivitis.

John A. McCaw, Denver, Colorado, did not believe that it was very easy to differentiate vernal conjunctivitis in certain stages from trachoma. In one of the cases presented, there had been a number of granulations almost typical of trachoma.

CONTRIBUTION TO THE KNOWLEDGE OF KERATITIS DISCIFORMIS

L. H. WAGNER.

AMSTERDAM.

A doctorate thesis, translated in abstract from the original Dutch, by Edmond E. Blaauw, M. D., of Buffalo.

The historical development of our knowledge of keratitis disciformis, which was given its name by Fuchs, although long known and named by v. Arlt "abscessus siccus," is traced by Wagner. E. von Hippel and Peters each described the development as they saw it, formulating a theory. Wagner gives the clinical histories of 16 cases, which had been treated in Straub's clinic since 1901. He relates three cases, with all the typical earmarks of the disease, which healed in a relatively short time with a remaining more or less distinct leucoma.

Case 13, examined histologically, is that of a man 77 years old, who was admitted to the hospital on the third day of May, 1909, with a very inflamed eye. He being practically deaf will account for the absence of an anamnesis. R. a strong injection, limbus much swollen, especially upward, and goes too far over the cornea. Below, a small grayish corneal sickle borders the pushed-forward limbus. Upward where the limbus-tumefaction is most pronounced, a large crescentic marginal ulcer, staining with fluorescein, is seen. The largest part of the corneal center looks dull, somewhat fatty, and does not stain with fluorescein. The center is yellowish white, sharply limited; and the opacity seems to be in the corneal substance, while a much larger grayish opacity, still deeper, surrounds this. Only at the nasal side a connection between the large marginal ulcer and the deep central disc exists. Tension normal. Hardly light perception. A puncture in the lateral upward part does not evacuate a hypopyon.

The condition did not become better and the patient suffered much pain. On May 7th enucleation. The hypopyon had increased. Cultures from this gave a few colonies of staphylococcus pyogenes albus. Three days later a rabbit's cornea was infected with a superficial and deep stab. The superficial developed to a white superficial ulcer, the deep stab produced a deep opacity in the cornea, from where fibrin precipitated at the posterior surface of the cornea and at the margin of the iris.

The hardened eye was sectioned sagittally. The conjunctiva bulbi is everywhere much thickened and infiltrated with masses of lymphocytes. This infiltration is especially pronounced in the region of the corneal limbus. The cornea is without epithelium as far as it is not covered by conjunctiva. At the upper part where the conjunctival epithelium stops suddenly, the lower side of this conjunctival prominence is without epithelium. This points to an ulceration between cornea and conjunctiva, of which the marginal ulcer described in the case history is a part. Here the conjunctiva is as thick as the cornea below, and much infiltrated with lymphocytes; the vessels are enlarged, crowded with red blood cells, and more numerous than normally.

At the lower part the conjunctiva is even more pushed out, and is also thickened and infiltrated. When the corneal epithelium reaches the place where it is not covered by overhanging conjunctiva, it becomes detached from Bowman's membrane, and is seen as a thin, loose epithelial flap. At its beginning thick, the epithelial layer of the conjunctiva becomes gradually thinner, until it consists of only two or three layers at its transition into the corneal epithelium, which remains of a similar inferior quality.

The corneal-conjunctival ulcer has caused more destruction at the temporal side, so that here large crypts are found in the conjunctiva, formed thru destruction of cells. These

are filled with free lymphocytes and some epithelial cells.

The cornea has become thinner, especially in its upper half, which has a thickness of 0.4 mm. The surface is uneven and shows three depressions; one in the center, one just above this, and one just below the superior conjunctival border. The upper four-fifths of the cornea are without epithelium. In the lowest fifth, the epithelium consists of two or three layers of degenerated cells. These lie irregularly and have an abnormal shape. Bowman's membrane is present with the exception of the upper fifth, the seat of the ulceration of the cornea and conjunctiva. With weak magnification, the parenchyma shows two parts: A posterior part poor in nuclei, and an anterior part rich in nuclear elements. The posterior part suggests a total necrosis. The boundary of these two zones lies about in the middle corneal layers. The part poor in nuclei forms a disc, which is limited sharply forward and backward. Upward and downward the disc goes over into more normal cornea. The transition is quicker in the upper part. The transition is gradual at the nasal and temporal side, and quicker at the nasal side.

The disc, poor in nuclei, lies paracentrally to the nasal side and upward; and has the size of about two-thirds of the entire cornea. The membrane of Descemet forms the posterior of limitation, so far as it is present. Where it is absent, polynuclear leucocytes lie directly against the nuclei-free parenchyma. The necrotic disc contains, in a few spots, a normal or a degenerated corneal cell; and here and there in a slit, a small row of partly normal, partly degenerated lymphocytes. Hematin colors the disc slightly blue, which may demonstrate some dissolved nuclear substance in the corneal slits. The corneal fibers in the disc can be recognized as such; they are thinner and shorter than normal. Where the transition to living cornea happens, the fibers become thicker and the waving is stronger. The anterior layer, characterized by a large number of nuclei, contains nuclei more or less degenerated, just before passing into the necrotic disc. The surrounding parenchyma shows a large increase of normal corneal corpuscles, in contradistinction to the surroundings of the necrotic disc, where the increase is far less excessive. Any sign of connective tissue formation is absent here.

Over a small extent, the necrotic disc lies against a thin layer with wide, intensive blue slits, filled with nuclear remnants, surrounded by a few more or less changed lymphocytes, directly against Descemet's membrane. Those lymphocytes which lie directly against the membrane show the least changes. The anterior corneal layer, characterized by more cells and local conglomeration of lymphocytes and enormous decay of cells and nuclei in its most forward part, does not represent the entire original anterior half of the cornea. The most forward corneal layers have been destroyed, in some parts entirely. The largest defect is in the upper part of the cornea. About 3 mm. lower a similar defect exists. In the margins of these defects a number of young connective tissue cells are found.

Recapitulating, we see that the necrotic disc is limited, forward by a fairly strong infiltrated tissue, with numerous killed lymphocytes; backward partly by a similar infiltrated tissue, partly by the membrane of Descemet, partly by an agglomeration of polynuclear leucocytes, and toward the sides by living corneal tissue, which shows a moderate increase of its normal nuclear elements. Descemet's membrane is absent for about the fourth part of the corneal center. For nearly its entire extent, a single layer of lymphocytes is found between it and the corneal parenchyma. The endothelium is nowhere present in normal condition. It is entirely absent or it is much proliferated. Spots are found where the endothelial cells are irregularly dispersed on the membrane; polynuclear leucocytes and some lymphocytes lie between these.

In other places the endothelial cells are entirely free from the membrane and sometimes at a little distance away; they then have proliferated in

the fibrinous hypopyon, strongly infiltrated with polynuclear leucocytes, which covers the posterior wall of the cornea. They show a strong inclination to proliferation, which goes sometimes so far that true giant cells are formed. Quite a number of these giant cells are present.

Anterior Chamber and Iris. The fibrinous hypopyon covers the entire posterior surface of the cornea, and lies on the iris, the pupil remaining free. It is formed by fibrin and polynuclear leucocytes with here and there a lymphocyte. A number of large phagocytes lie in the angle of the anterior chamber, and in some places also against the posterior surface of the cornea. About both arterial circles of the iris, a strong lymphocytic infiltration is seen. The surface of the iris is also much infiltrated. Some polynuclear leucocytes have penetrated the iris tissue. These two layers, the lymphocytes in the iris and the leucocytes on the iris, are fairly sharply separated.

In the other parts of the eye, there are no changes. Only in the optic nerve a distinct beginning of the formation of Schnabel's caverns exists. Wagner comes to the conclusion that the disciform keratitis is characterized by a disclike part of strongly altered corneal tissue, lying deep; caused by toxins, produced by microorganisms existing in the epithelium. These have not yet been discovered, but their presence we can surmise with great probability.

THE PROBLEM OF IMMEDIATE ENUCLEATION.

(Sul problema dell' enucleazione immediata)

PROF. A. ANGELUCCI.

NAPLES, ITALY.

Abstract translation from Archivio di Ottalmologia, 1917, p. 159, by William H. Crisp, M. D.

Basing their faith on the German statistics of the war of 1870, the French surgeons had for many years relied absolutely upon enucleation. According to these statistics, the wounded eye damages the sound eye sixty times in every hundred. But the Germans had included in their statistics all the cases of reflex traumatic neurosis. Gradually the statistics of true sympathetic ophthalmia in the sound eye were reduced to seven per thousand. That the Italians resort somewhat sparingly to enucleation is indicated by the fact that of about six hundred wounded who were received in Angelucci's eye clinic, only seventy-seven had one eye enucleated. Of five hundred and ten wounded eyes he personally was only obliged to enucleate thirty-eight; three times only, blind eyes were enucleated to relieve the sound eye of a reflex neurosis which rendered it irritable to light.

On the Carso wounds of the eyes represented 1.8 per cent of general wounds, so that it is important to establish a clear policy in the problem of enucleation. The ophthalmia which passes to the sound eye is today extremely rare, develops ordinarily after the second week, and the wounded eye has already assumed a quite familiar menacing aspect. After eight weeks from the wound, the danger is almost passed. Thus no circumstance renders enucleation urgent except in eyes smashed by the wound, deformed or afflicted by infective processes.

Does enucleation completely guard against the danger from sympathetic ophthalmia which we fear? Schieck relates eight cases which have occurred to him in this war period. Now in four of these cases the wounded eye had been removed when the other eye was completely healthy. Enucleation does not therefore possess an absolutely preventive action, although it may be remarked that in Schieck's cases the ophthalmia which followed was of benign evolution. Dimmer and Peters ask the question whether the extreme rarity of

sympathetic ophthalmia after military wounds is related to the terrain? If better in the soldier, it favors the supposition that sympathetic ophthalmia is facilitated by processes, toxic and infective in their course.

The only case of sympathetic ophthalmia observed by Angelucci harmonizes with these clinical beliefs. The left eye of a young officer was enucleated two days after the wound, and after the third week he became aware of the first symptoms of visual deficiency, especially in the upper sector of the visual field. While at home on leave of absence there was an alternation of deterioration and improvement; after four months he could hardly find his way about. He came to the clinic with the stump extremely painful beneath the glass eye. After the iridochoroidal symptoms had almost disappeared from the right eye, the visual field and the ophthalmoscopic appearance revealed a classic process of retrobulbar neuritis, the papilla was whitish and slightly obscured, the arterial vessels very slender, and some of the veins markedly congested. After urgent removal of the painful cicatricial stump, and under endovenous injections of sublimat in one per cent solution, iodin of arsenic and of strychnin, the vision rose in a short time to 7/10. (There was however a suspicion of syphilis.)

Sympathetic ophthalmia has been known to arise after operations for traumatic cataract. Valude relates a case operated upon for cataract two months after the injury; the operation was followed by iridocyclitis and by a fatal sympathetic process in the sound eye. Morax has observed only one case of sympathetic ophthalmia in fifteen hundred wounded soldiers, and this case followed cataract extraction done two weeks after the injury. In this case, however, the iris prolapsed through the operative wound. Cautery of the prolapsed part was resorted to with the galvanocautery, and ten days later a serious sympathetic process involved the sound eye.

Angelucci urges that in every case a careful study should be made before deciding to remove the injured eye. He refers to some personal cases in which, altho in earlier times the eyes would have been removed on account of penetrating injuries, removal was not resorted to but the eyes were preserved with a perfectly normal aspect; and to other cases in which fairly useful vision was retained in eyes which some surgeons might have decided to remove.

DISTURBANCES OF VISION BY CEREBRAL LESIONS.

Lt. Col. Gordon M. Holmes, R. A. M. C.

LONDON.

Abstracted from the Medical Press, December 26th, 1917, by Charles H. May, M. D.

The writer has presented a very instructive paper based on exhaustive researches carried out in the hospitals of France—a sequel to the article of 18 months ago on "Disturbances of Vision Produced by Gunshot Injuries of the Visual Cortex and of the Optic Radiations," written in conjunction with Colonel Lister (see p. 191). He gives the conclusions arrived at in the former paper relating to the cortical representations of the retina, and the segmental correspondence of different areas of the retina with separate zones of the cortical visual area. These agreed with those already arrived at by Inouye from a study of cases in the Russo-Japanese war, and by others; and are now strengthened by many observations made by Holmes since presenting his first article.

The most interesting local defects in the fields of vision are central and paracentral scotomata, which are very

common in all moderate injuries of the occipital lobes. Injury of the poles of both hemispheres may cause complete loss of central vision. An unilateral wound produces homonymous scotomata in the opposite halves of the fields. A common type of case is that of pure lateral paracentral scotoma, as a result of a penetrating wound of the skull of the opposite side.

The writer discusses the nature of the lesions, taking up first, concussion. When the visual defects persist for a considerable time, they are due to a simple destructive lesion. Quick recovery probably depends upon the existence of an edematous swelling of the areas concerned, analogous to that which is seen in the myalin sheaths of the spinal cord. Next follows a discussion of the mechanism and function of peripheral vision and disturbance of color perception caused by cerebral lesions. Holmes considers that it has not been conclusively shown that color perception may be completely lost in any part of the field, when that of light or white is undisturbed; many of the hemiachromatopsias have been instances of hemiamblyopia. He had frequently observed among his cases that red and green test objects could not be recognized in certain regions, often in homonymous halves of the visual fields. But in every instance visual sensibility to white test objects of the same size was reduced; his observations led him to the conclusion that an isolated loss or dissociation of color vision is not produced by cerebral lesions.

The paper includes a discussion of disturbances of visual attention and loss of visual orientation and appreciation of depth; and concludes with the following summary, which is offered at least as a working hypothesis for further investigations:

1. The upper half of each retina is represented in the dorsal, and the lower in the ventral part of each visual area.

2. The center for macular or central vision lies in the most posterior part of the visual areas, probably on the margins, and in the lateral surfaces of the occipital poles. The macula has not a bilateral representation.

3. The center for vision subserved by the periphery of the retina is situated in the anterior portions of the visual areas, and the serial concentric zones of the retina from the macula to the periphery are probably represented in this order from behind forwards in the visual areas.

4. Those portions of the retinas adjoining their vertical axes are probably represented in dorsal and ventral margins of the visual areas; while that in the neighborhood of the horizontal axes is projected on to the walls and the floor of the calcarine fissures.

Severe lesions of the visual cortex produce complete blindness in the corresponding portions of the visual fields, or, if complete, an amblyopia, color vision being generally lost, and white objects appearing indistinct; or only more potent stimuli, such as objects moved sharply, may excite sensations.

6. The defects of vision in the fields of the two eyes are always congruous and superimposable, provided that no disease or injury of the peripheral visual apparatus exists.

7. Lesions of the lateral surfaces of the hemispheres, particularly of the posterior parietal regions, may cause certain disturbances of the higher visual sensibility, as loss of visual orientation and localization in space, disturbance of the perception of depth and distance, visual attention loss, and visual agnosia.

SHORT ABSTRACTS.

Under this heading only points of the greatest importance will be noticed. For the systematic review of the literature see "Digest of the Literature," a part of which appears each month.

Foster, M. H.—The Clinical Course and the Diagnosis of Trachoma. (Journal American Medical Association, December 1st, 1917.)

This interesting article presents some new ideas and methods of diagnosis worthy of note and consideration. The author divides trachoma clinically in two forms: (1) fulminating trachoma, and (2) slow trachoma. The first type has been denied by some authorities, but Dr. Foster was able to observe it among the crowded steerage passengers of vessels coming to Ellis Island. Slow trachoma may itself be either acute or chronic.

For making the diagnosis proper examination of the lids is of great importance. For this purpose and specially to expose the cul-de-sacs, the best instrument is the ordinary wire loop glove buttoner, with its blade slightly bent upon its plane, resembling a miniature obstetric forceps. By pressing the tip of this instrument upon the skin surface of the everted lid and putting the structures over it on the stretch, the conjunctiva can be made more or less anemic. It is important to become familiar with the appearance of the normal lid subjected to this pressure, and then to study the common inflammations and trachoma.

When the normal lid is made tense by pressure the blood is forced out of the tissues and a white area appears, which is pure white or pink and shades out evenly in all directions. Faint vertical streaks running up and down, due to the Meibomian glands, are seen. The same condition holds true for all simple inflammatory conditions of the lid.

In trachoma, however, when the conjunctiva is made anemic in this way, it does so in a blotchy and uneven manner. The bloodless area does not fade out evenly to the pink and red of the normal conjunctiva, but patches of red and white alternate in a more or less haphazard and irregular fashion. White streaks run not only up and down but transversely and in all directions. To get this effect too much pressure must be avoided.

The explanation of this phenomenon is that in trachoma the structures are not homogenous as in normal lids. Scar tissue is formed and deposited in irregular patches and between these, areas of highly vascular inflammatory tissue or normal conjunctiva exist. When pressure is made, the ordinary invisible scar tissue becomes white, so that by this maneuver the oculist is enabled to diagnose the early stages of trachoma.

According to Dr. Foster trachoma might be better called "scar producing conjunctivitis." The scars begin in mild cases at the inner canthus at the junction of the tarsal plate with the cul-de-sac and the latter becomes completely transformed into scar tissue, long before the process is completed on the upper lid.

The diagnosis between trachoma and follicular conjunctivitis must be based not only on the condition of the conjunctiva of the cul-de-sac and lower third of the tarsus, but also on the blood supply of the former. In normal eyes the cul-de-sac is bluish pink and contains numerous blood vessels; at this spot the conjunctiva is thin so that the arteries stand out very distinctly like cords, anastomosing at the base of the tarsal plate by horizontal branches which form pointed arches. From these arches numerous fine vessels rise which run directly upwards, on the inverted lid. (The author refers probably to the arcus tarseus superior which runs upon the fascia tarso-orbitalis and gives vertical branches.) In trachoma the normal vertical vessels disappear in the cul-de-sac; only adventitious vessels, running

sometimes in an oblique direction, can be detected.

In follicular conjunctivitis the vessels may be hidden, but, says the author, "if any vessels are observed running in a vertical or approximately vertical direction across the cul-de-sac it is safe to exclude trachoma." Occasionally it may be necessary to treat the eyes with a slight astringent in order to relieve a temporary inflammation, before giving a positive opinion.

Foster prefers grattage made with a tooth brush to expression or curetting, because its results are more durable. When the tarsal plate is involved grattage must be followed, some weeks afterwards by excision of the tarsus. The illustrations accompanying this paper are unusually good, having been taken from nature at the U. S. Immigrant Hospital, and enlarged three times.

M. URIBE-TRONCOSO.

Sautter, Albert C., Philadelphia—**Ocular Palsies in Infantile Paralysis.** (Annals of Ophth., Oct., 1917.)

The writer calls attention to the infrequency of head symptoms in infantile paralysis, in the majority of cases the cord alone being involved. The involvement of cranial nerves is certainly not frequent; and in the majority of instances it is transient and followed by a restoration of nerve function. Cranial palsies may complicate cases resembling the Landry type of paralysis, a rapidly ascending, generally fatal type; or less frequently the descending type of the disease. In the bulbar-pontine variety, paralysis of the facial nerve is the most usual complication, paralysis of the extraocular muscles per se occurring most rarely. Of these the abducens and oculomotor nerves, in order of frequency, are most apt to be involved. Sometimes, however, a more or less complete ophthalmoplegia intervenes, which is usually unilateral. Implication of the optic nerve is rare.

Sautter gives the histories of two cases observed during the recent epidemic. One with bilateral external ophthalmoplegia still present after six months, the other an example of paralysis of conjugate lateral movements with marked improvement after six months.

A review of 669 case histories of infantile paralysis at the Philadelphia Hospital for Contagious Diseases in 1916 is given. Nineteen, or 3 per cent, showed disturbance of the extraocular muscles. Of these 13 were sixth nerve paralysis, and 4 of these were complicated with seventh nerve paralysis; 3 presented bilateral sixth nerve paralysis, one external ophthalmoplegia, and another paralysis of the associated ocular movements. There was ptosis in one instance, and ptosis combined with other ocular lesions in two others. Nystagmus was noted in several cases. In seven of the 19 cases, the cranial nerves were the only nerves affected. Facial paralysis was comparatively frequent and occurred in 78 patients. In the few cases examined ophthalmoscopically, no fundus changes were found.

In accord with the findings of other investigators, he found the seventh nerve most frequently involved, then the sixth, and least often the third. Reviewing some other reports he quotes Medin's analysis of 64 cases with facial palsy in 9, hypoglossal paralysis in 5, sixth nerve paralysis in 6, eleventh nerve involvement in 4, third nerve palsy in 3, fifth nerve paralysis in one, and in one or two, tenth nerve involvement. Wickman in the Swedish epidemic in 1905, found in 868 cases, isolated cranial nerve palsies in 22, and combined cranial and spinal nerve palsies in 34.

Leegard in 311 cases taken from the Norwegian epidemic in 1905 reports only two isolated cases of facial palsy, and 3 cases associated with spinal symptoms, also one case of ptosis with spinal symptoms. E. Mueller in 100 cases found 13 facial palsies, 3 unilateral abducens palsies; no other nerves involved. Zappert in 290 cases from the Vienna epidemic in 1908 found cranial association with spinal nerve lesions in 25 patients. And finally in the New York epidemic in 1907 an analysis of 752 cases showed 27 facial, 18 lid palsies, and 26 cases of strabismus.

C. H. M.

Leplat.—Ocular Troubles Produced by Distant Explosives. (Archives Med. Belges, May, 1917.)

A soldier stationed at a distance of one mile to a mile and a half from a powder charge was injured in the eye by the explosion.

When seen the eye presented hyphemia and ciliary injection, the anterior chamber was sprinkled with blood and disturbed. He complained of moderate pain in the eye and photophobia. A cure was complete after seven or more days. DANIS.

Burger.—Study of the Syndrome of Claude. Bernard - Horner. (Arch. Med. Belges, April, 1917.)

A soldier was injured on the left side in an automobile accident. The next day the left eye presented moderate ptosis, enophthalmos, miosis with preservation of reflexes, lacrimal secretion and rapid nystagmus. Diplopia on looking up and to the right, and hypotony of the globe. Relaxation of the vocal cords on the right side, and ocular paralysis.

Conclusions: Ocular lesions were associated with disturbance of the seventh, tenth and eleventh nerves and the cervical sympathetic. DANIS.

Rasquin. Provoked Conjunctivitis. (Arch. Med.. Belges, April, 1917.)

This form of conjunctivitis induced by soldiers to escape military service has the following characteristics:

1. It is always unilateral.

2. The conjunctiva is inflamed and swollen, sometimes violently so, but rarely as evidenced in diphtheritic conjunctivitis or from injury by caustic. The conjunctiva of the lower cul-de-sac only is affected.

3. Examination of the secretion never shows bacteria, but reveals epithelial cells or polynuclear cells, and sometimes the cause of conjunctivitis.

4. The source of injury is often found in the pocket-book, a leaf, or in the watch case.

5. The malady is cured without treatment other than hermetically sealing the eye. DANIS.

Brunetiére and **Amalric.—Severe Hemorrhage Following Rupture of Sclera.** (La Clinique Ophtalmologique, May, 1917.)

As army specialists these surgeons are of the opinion that enucleation should only be performed after thoughtful consideration by ophthalmic surgeons and should not be advised by operators unskilled in this specialty. They illustrate their point by a case report: A soldier was wounded by a shell fragment which penetrated the lids over the caruncle, splitting conjunctiva and sclera. Despite pressure and irrigation hemorrhage was so profuse that immediate intervention was called for. Hand movement was appreciated to a certain degree, so under general anesthesia a scleral suture was inserted which immediately stopped the blood flow. There was no escape of vitreous, showing that the injury had only penetrated the outer layers of the choroid. The final result was a vision of 4/10 and the entire history proves, in the authors' opinion that oculists are required even in the evacuation hospitals so as to be available early in the course of the injury. J. S. W.

Santos Fernandez, Juan.—The Absence of Dressings in Eye Operations. (Archivos de Oftalmologia Hispano - Americanos, September, 1917.)

The author mentions several cases of unruly patients who took off the dressings the day of their operations and in spite of that were cured, healing of the flap being generally completed in the second day. He agrees with Menacho that in cases of normal tension the dressing is not absolutely necessary and could be avoided, but thinks that it would be better to wait at least two days after the operation to dispense with it. F. M. F.

Garcia.—Cataract Complicated by Hysterical Amaurosis. (La Clinique Ophtalmologique, June, 1917.)

Garcia describes the case of a forty-two year old woman who had had previous attacks of hysteric nature. The lenses had become cataractous gradually; but two months before admission

she lost completely the light perception in both eyes. As she showed no signs of intraocular trouble it was decided to attempt an extraction even without much hope. The presence of lacrimal disease delayed the procedure twenty days, after which a perfectly simple operation was performed and although the pupil was black no light was appreciated. Twelve hours later the patient had a slight convulsive seizure. On the third day her vision improved and on the fifteenth with a + 11 she saw 2/3. Qualitative vision also returned in the unoperated eye. J. S. W.

Darier.—Treatment of Iritis with Sera, Sensitized Vaccines and Sero-Bacterins. (La Clinique Ophtalmologique, June, 1917.)

Darier has been experimenting for years with serotherapy in ocular infections and has found no specific except for diphtheria. His paraspecific injections have been fairly successful only with diphtheritic and antitetanic sera while the others have failed. For the past three years Darier has endeavored to replace the diphtheria serum of Roux by a polyvalent one, but his results have not improved. The action is assumed to be an increased phagocytosis with a stimulation of the nerve cellular agents.

His most recent successes have been with Mulford's sero-bacterins and in three cases the pain of acute iritis disappeared within a few hours. These cases were all of obscure origin with no discovery of a specific cause and four injections gave complete cures. Darier gives full credit to Wendell Reber as the first to claim the great success of sero-bacterins in the treatment of iritis. J. S. W.

Darier.—Parenteral Injections of Sterilized Milk for Ocular Infections. (La Clinique Ophtalmologique, June, 1917.)

Darier mentions the recent reports of success with milk published in Germany. Pflugk of Dresden considers this remedy the most important discovery in the past twenty-five years and he has had remarkable results in all infections including gonorrheal ophthalmia with corneal involvement. In phlyctenular conditions and choroiditis no results have been obtained so it is necessary to determine the indications for this new therapeutic measure. The manner of preparing the milk must be most precise. The cow is tuberculin tested. The milk is projected directly into ten cc. ampules and then sterilized for thirty minutes in jets of steam on two successive days. This gives the milk a pale brownish color with small bits of casein floating around, these, however, never interfering with the syringe nor influencing the curative action. The entire 10 cc. are to be used.

Then follows the discussion upon this subject at the Vienna meeting. Koenigstein has used this method in 30 cases with great relief in keratitis and iritis after 2 injections. No benefit in trachoma, slight constitutional changes and in two cases, characteristic exanthem. Dimmer thinks that the action is purely from the albumin which is the source of benefit in Deutschmann's yeast therapy and Darier's paraspecific methods. Leopold Mueller has obtained no results in muscular paralyses and optic atrophy and said that the observations were much too recent to draw conclusions.

The most remarkable results quoted are obtained in interstitial keratitis which had resisted all energetic specific cures and local treatment. The injection of an albuminoid produces an immediate disappearance of the pain and photophobia with a marked shortening of the course of the disease. Three injections of 5 cc. of milk per week is sufficient. Darier with his serum method has stopped the subjective symptoms but has seen no miraculous cures, and doubts the production of these unbelievable miracles, but is willing to give the method a more thorough trial. J. S. W.

Kirk, J.—Eye Changes in Trench Nephritis. (*Brit. Med. Jour.*, Jan. 5, 1918.)

While on duty at Malta, the writer had the opportunity of examining a series of about 80 cases of trench

nephritis, or what he prefers to call war nephritis, all coming from the Macedonian front; these were chiefly young active soldiers between 20 and 30 who had suffered fairly severe exposure and strain. Nearly all the cases presented the disease in a severely acute form, and on their admission were mostly seriously ill; at that time there was found invariably marked retinal congestion with large pulsating veins but no signs of exudation or nerve involvement. Some weeks later nerve swelling and patches of retinal exudate were found in some; this led to re-examination of all of the cases about three months from the onset of their illness, and the writer was then able to classify them as follows:

Group A (about 21), all convalescent with no symptoms except slight anemia and debility and generally no albumin in the urine, except a slight trace in a few, showed retinal changes in only four instances, and such changes were slight—a few small spots of exudation, a small punctate hemorrhage, a slight haziness of the disc edges, or a little edema along the course of the veins.

Group B, a series of 20 cases who had not progressed as well as the others, showed albumin in small amount, and often dyspnea and slight edema; 8 of these showed minor retinal changes with small spots of exudate.

Group C, 13 in number, were severe cases in which the disease was still marked; these were suffering from marked general symptoms, severe edema, a large quantity of albumin in the urine and sometimes blood; 4 of these showed very definite retinal changes and 4 changes of slighter nature.

As far as could be ascertained, there were no signs of any other complicating disease, with the exception that several cases showed malarial infection. In none was there any history of previous kidney attacks. In 9 of the cases presenting the more severe retinal changes a Wassermann test was done, and in all of the 9 the result was negative.

Regarding the fundus changes, it was observed that while the spots of exudate were near the disc and macula, the typical silvery star-shaped figure was not seen. Hemorrhages were uncommon, and when seen were of the small punctate variety. The disc was often affected, either definitely swollen or slightly indistinct at the edges. There were small areas of edema, especially along the course of the veins.

In summarizing, the writer says that in this disease the retina is very liable to be involved, although gross changes are not evident early and later there may have been absorption; that the pathology is probably an acute congestion from some specific toxin, and that the exudate clears up in the majority of instances without leaving permanent results; that the retinal changes do not affect the prognosis, except in so far that the severer these changes the severer the cases, though by no means necessarily so; and that the condition is one which is probably allied to the acute retinitis of pregnancy, scarlatina, and acute uremia, and should not be confounded with the retinitis of chronic kidney inflammation with its permanent changes in the retinal circulation vessels and tissues. C. H. M.

SOCIETY PROCEEDINGS

PITTSBURGH OPHTHALMOLOGICAL SOCIETY.

Meeting of February 4, 1918.

Dr. Edward Stieren, Vice-President, in the chair.

Ptosis and Abducens Paralysis.

Dr. J. Floyd Murdock presented for study and suggestions as to treatment Albert H., age 13, school boy. The labor at his birth was long and difficult, forceps having been used. The mother noticed shortly afterward a marked drooping of the left upper eyelid, which has remained unchanged until the present time. Inspection shows a slight facial asymmetry, complete ptosis of the left upper lid and a small depressed scar over the left parietal region; the eye seems to be slightly proptosed. There is a paralytic convergent strabismus, abduction each eye being nil, and the rotation upward and downward greatly impaired. The pupillary reactions are normal. The ophthalmoscopic examination shows in each eye a moderate refractive error, but no organic lesion. Vision without correction is O. D. 20/40, O. S. 20/70.

Discussion.—Dr. Adolph Krebs stated that as there is no manifest diplopia, operative interference with the strabismus was inadvisable as an approximation of the images might produce a very troublesome diplopia, the fusion sense being undeveloped.

Dr. Stieren suggested a plastic procedure for the correction of the ptosis —for cosmetic effect—that of Panas being mentioned as particularly applicable in this case.

Optic Atrophy.

Dr. S. A. Sturm presented W. C. M., age 28, electrician. In December, 1916, his lumbar region came in contact with a wire carrying 2,200 volts. He was unconscious for five or six minutes, was slightly burned, but returned to work in two or three days. In January, 1917, the back of his neck came in contact with a wire carrying 500 volts. He was unconscious at this time for only one minute and was not burned. Within a month he first noticed a gradual diminution of the visual acuity, more marked in the left eye, which has progressed until at present time he has light perception only in each eye. The patient is positive that prior to January, 1917, his vision was good. He does not admit venereal infection, although his wife has never been pregnant. The patellar reflexes are absent, station is decidedly unstable, gait ataxic, coordination of upper extremities is good. The pupillary reactions are normal and the ophthalmoscopic examination shows each nerve head to be atrophic, of a dirty grayish white color and the arteries somewhat contracted.

Discussion.—The members present were of the opinion that the optic atrophy was primary and advised the securing of a Wassermann.

Tumor of Orbit.

Dr. E. E. Wible reported the case of Mrs. B. C., age 29 years, housewife. She has had three children, of whom one is living. Family history is negative as to cancer, "tumor," etc. Present weight is 115 pounds; maximum weight three years ago, 145 pounds. Present trouble began about two years ago, at which time she developed violent cephalalgia in the region of the left vertex, recurring at intervals of a week or more. The attacks have gradually increased in frequency and severity. Two weeks before consulting Dr. Wible, exophthalmos began to develop on the left side, and when first seen the eyeball was almost entirely proptosed, downward and outward, the conjunctiva chemotic and the cornea sloughing, the entire mass being about the size of a lemon. A hard mass, firmly fixed, was found protruding from the orbit, up and inward, and a clinical diagnosis of sarcoma was made. An exenteration of the orbit was advised and was performed the following day,

Jan. 18, 1918. The postoperative history of the case has been uneventful to date.

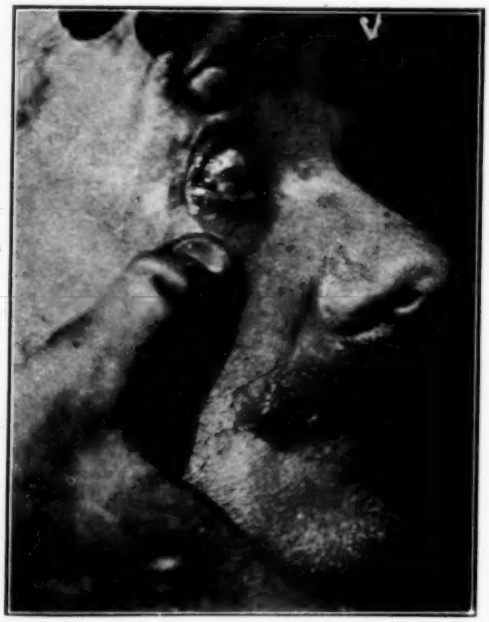

FIGURE 1.
Case of pedicled growth attached over insertion of external rectus muscle (Stieren).

The pathologic report was a "rhabdomyoma," which is extremely rare in this locality, but very few cases having been reported in the literature.

Epithelioma at Limbus.

Dr. Edward Stieren reported the case of H. W. B., age 45 years, who came Aug. 27, 1917, with a huge cauliflower growth of the right bulbus (Fig. 1). Arising over the external rectus by a strong pedicle, it took on a mushroom shape, and was 12 mm. in length, 8 mm. in width, and about 10 mm. high. It extended from the external canthus, overlapped the cornea to its center (Fig. 2); and projected forward between the lids, which could not be closed over it. The surrounding conjunctiva was inflamed and thickened and there was considerable ropy discharge. The color and general appearance of the mass was that of a pale red raspberry. There was no involvement of the preauricular or any of the lymphatic glands.

According to the patient's statement the trouble began about a year ago as a localized inflammation with a slight elevation. He has a lesion above the right ear which has been diagnosed as "skin cancer" and for which radium exposures are being used with good results. Under local anesthesia the growth was removed at the South Side Hospital Aug. 29, 1917. Two parallel, horizontal incisions were made about 3 mm. above and below the growth, extending from the limbus of the external canthus, and the conjunctiva between, including the subconjunctival tissue, and the growth dissected off. At only one point, over the insertion of the external rectus, was the growth attached to the sclera. Four vertical incisions were then made, two upward, from the ends of the upper horizontal incision and two similar ones downward, the upper and lower flaps of conjunctiva dissected loose and sutured over the defect. There was no involvement of the cornea, not even a haziness of its epithelium.

Healing was prompt and uneventful, the sutures being removed on the fifth day. The specimen was examined by

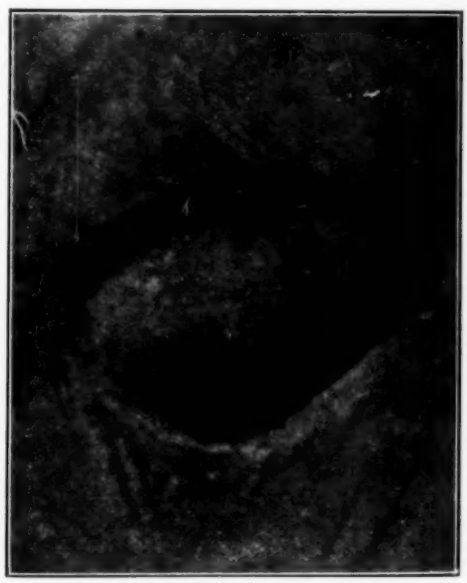

FIGURE 2.
Stieren's case of epibulbar tumor showing extent of overlapping of the cornea.

Dr. Jacob Rockman, who pronounced it an epithelioma of papillomatous type. Appreciating that recurrence of epithelioma after local removal is common, X-ray exposures to the site were urged and accepted. He was accordingly rayed by Dr. G. N. Schaeffer, nine exposures of from one to two milliamperes, in two to four minute seances, being given at intervals from Sept. 4, 1917, to Oct. 27, 1917.

He was last seen the early part of this year. The conjunctiva is pale, smooth and glistening, and is on tension only when patient looks strongly to the left, and there is no limitation of excursion. Vision in each eye is 6/5.

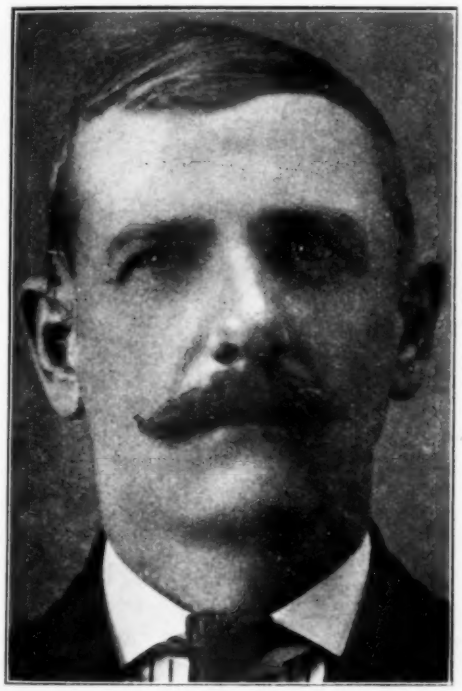

FIGURE 3.

Appearance of patient two months after removal of growth.

The accompanying photograph (Fig. 3) was taken about Nov. 1, 1917. Since then his appearance has further improved, inasmuch as he has acquired the habit of opening his right eye as widely as his left.

HUNTER H. TURNER.

ROYAL SOCIETY OF MEDICINE.

Ophthalmological Section.

Meeting of February 6, 1918.

PRESIDENT, MR. WILLIAM LANG, F. R. C. S.

Vitreous Changes from Penetrating Septic Wounds (Couching).

LT. COL. R. H. ELLIOT read a paper on this subject, illustrated by a profusion of slides, taken from a wide experience in India. The author reviewed the paper on a similar subject, published by Professor Straub in 1912, based largely upon the experimental injection of the eyes of two rabbits with tubercle bacilli, resulting in infection of the ciliary body. The Professor contended that the septic matter set up chemotactic action in surrounding vascular structures, and caused also optic neuritis.

Col. Elliot's present paper was based upon 780 cases of couching, and the anatomic examination of 54 globes. The material was therefore more abundant than Straub's, and there was a greater variety in the conditions of infection, for, in the practice of the operation by native Indians the instruments, hands, and surroundings were filthy. There was a great variation in the age and health of the patients, in the nature and virulence of the introduced organisms, in the period after operation at which the material was obtained, and in the methods of operation.

Slides were shown of extreme instances, and he asked that they might be regarded as affording an opportunity for the elucidation of pathologic problems, as a series of experimental infections of the eye with septic material. In couched eyes, the appearances found in the vitreous included slight gauzy films, filmy masses in the anterior part of the chamber, a fine cone of exudate in the vitreous, an organized cone of exudate, masses of exudate scattered through the vitreous and isolated inflammatory foci therein, total detachment of retina with inflammatory matting of all parts, and the remains after panophthalmitis. He contended that the difference between the

exudate massed in the anterior part of the vitreous and the cone of the vitreous was artificial. In his specimens there was a breaking of material in transit from India.

Localized infection of the vitreous was not met with, except in one case, in which the tip of a copper probe was left behind, and where organization appeared to be strongest near the ciliary body and near the optic nerve head, and this was a matter of vascular supply. The backward flow of lymph to the channels round the nerve head was suggested by the cone of exudate, and he showed specimens which supported this view. There were new-formed vessels in the apex of the cone of exudate. In the author's view, Straub's contention that hyalitis was due to chemotaxis following the deposition of septic matter in the vitreous, took too little account of the infection of surrounding structures. The occurrence of plastic uveitis sufficed to explain the vitreous opacities seen during life, as well as the vitreous exudate seen in the specimens. Detachment of the retina was found in 70% of the cases, and this was explicable by the pouring of exudate into the vitreous chamber, adhesion of the exudate to the retina, and a shrinking of the exudate. Was the pouring of the exudate into the vitreous chamber due to chemotaxis from an infected vitreous, or to a primary infection of the surrounding vascular coats? He inclined to the latter view. The lens lay in front of the anterior hyaloid membrane, and in two of the cases the vitreous was not invaded by the instrument, yet there was an abundant vitreous exudate. The retina contracted adhesions to the exudate by the wound and by inflammation the result of chemotaxis, by inflammatory thickening of the anterior layers of the hyaloid body, and by cicatricial bands radiating from the focus of infection.

Discussion.—Mr. Treacher Collins said he had spent some hours studying this wonderful collection of specimens, and found they abounded in points of clinical and pathologic interest. With regard to the mode of infection of the vitreous humour, Professor Straub's main contention was that the exudate from the ciliary body was not forcibly expelled therefrom, but drawn into the vitreous, an attraction into it by chemotactic action. Straub showed that the dust-like opacities in the vitreous, seen in keratitis, were little groups of phagocytes, not scattered promiscuously, but definitely arranged on the outer side of the hyaloid membrane. Straub did not, however, adequately explain why chemotaxis was more potent at certain points than at others. Mr. Collins' own contention was that the central points were not dead phagocytes, but dead tissue cells which had desquamated from the surface of the ciliary body or from the iris; that these were carried forward in the lymph stream of the aqueous and its duct to the back of the cornea, and there set up chemotaxis.

Mr. Herbert Parsons did not consider there was so much difference of opinion between Professor Straub and Colonel Elliot on this matter as the latter seemed to think, and much of it might be attributable to the Professor's incomplete knowledge of English. The value of Professor Straub's specimens was that they showed an early stage of the infection of the vitreous. It seemed clear there was a localized infection of the vitreous in the early stages, but that it rapidly passed into a general infection of the vitreous. He, Mr. Parsons, could not conceive of a lens being depressed, reclined, or transmitted into the lower part of the posterior chamber of the eye, without injuring the vitreous very seriously. He expressed his high appreciation of Colonel Elliot's contribution.

Contraction of Central Retinal Artery.

Major A. W. Ormond read a note on the direct observation of the fundus oculi during a period of temporary blindness. A major in the French Army, at present engaged in engineering work, came to consult him. Five days earlier, in the evening, he suddenly lost the sight of his right eye for about eight minutes, and since then he had had seven or eight attacks of equal duration. It was not followed by headache or pain. One attack occurred while he was in a darkened room. Some of the attacks seemed to be associated with his movements, such

as stretching his arms after sitting in a cramped posture. He had lived for some years in the French Gaboon, and had suffered badly from lumbago.

While giving his history, he had an attack, and Major Ormond examined the eye while it was in progress. The pupil of the right eye enlarged to about 7 mm. in diameter. The optic disc was blanched, also the immediately surrounding retina. Veins alone of the vessels were evident, the superior and inferior retinals being those chiefly under notice. The inferior retinal showed distinct notching on its concave side only: there were four or five notches. While being watched they suddenly disappeared. The vein resumed a normal appearance. The patient then suddenly remarked, "It is coming back." In a few seconds he could see again, and the pupil contracted to the size of the other. The optic disc looked redder and more suffused than normal. The arteries showed their position, the superior artery twisting round the superior vein, so causing the appearance seen when first looking at the eye. It seemed to have been a localized contraction of the central retinal artery, resulting in a temporary blanching of the disc and retina in the immediate neighborhood, with a gradual lessening of the blood in the veins, so that the endothelial lining had become ruffled into horizontal folds as the lumen emptied. Subsequent pressure on the globe with the finger resulted in almost complete emptying of the artery and considerable depression of vision. Dr. John Fawcett's examination of the patient a few days later did not reveal any signs of organic disease. His maximum systolic pressure was 130 mm., and the radial arteries were good. Heart and urine were normal. The contraction of retinal arteries seemed to be similar to that in the "amblyopia of migraine." It could scarcely be regarded as intermittent obstruction. The attack was probably due to sedentary life and excessive cigarette smoking.

Somewhat similar cases were referred to by the President, Mr. Herbert Parsons, Mr. Bardsley, and Mr. Vernon Cargill.

H. DICKINSON,
Reporter.

WILLS HOSPITAL OPHTHALMIC SOCIETY.

Meeting of December 4, 1917.

Disciform Keratitis.

DR. WM. ZENTMAYER presented a case of disciform keratitis, in a carpenter 51 years of age, who stated that two months ago, the vision of the right eye became blurred. The eye had been uncomfortable for several months before the vision was affected. There is no history of injury. Examination shows a very slight pericorneal injection. On the cornea, somewhat eccentrically placed up and out, there is a disc shaped opacity about 7 mm. in diameter. The rim of the opacity is more dense than the central portion except at the exact center where there is also a spot of slightly deeper infiltration. The whole area is made up of fine granular dots. The upper margin of the opacity reaches within two millimeters of the limbus, and at this point the infiltrated margin is a little broader than elsewhere, giving a signet-ring appearance. At this point the limbal conjunctival vessels are slightly enlarged. The entire area of infiltration is anesthetic. Tension is slightly minus.

Dr. Zentmayer said that he was willing to accept the view that this type of keratitis was of neuropathic origin; but he thought that the theory of mild infection was more in keeping with the clinical features, the course, and the results of experimental research.

Tuberculous Keratitis.

DR. SAMUEL D. RISLEY, discussing the subject of tuberculous keratitis, said that in his experience the tubercular deposits in the cornea were suggestive of uveal involvement, since they usually occurred at the angle of the anterior chamber or on the membrane of Descemet, which was embryologically an extension forward of the uvea. He cited as corroborative of this view the case of a man upon whom he had performed an iridectomy for the relief of an acute attack of increased tension. Convalescence was tedious, and the examination with oblique illumination revealed a grayish deposit in the region of the base of the coloboma. A von Pirquet test produced marked lo-

cal and general reaction with elevation of temperature. The eye recovered rapidly under the effect of increasing doses of old tuberculin. The ophthalmoscopic examination revealed a condition of general choroiditis with atrophic yellowish patches.

Dr. Risley thought that the tubercular choroiditis was a sufficient explanation for the abrupt onset of increased tension of the globe, and for the delayed convalescence after the iridectomy.

Epithelioma of Orbit.

Dr. Wm. Campbell Posey exhibited a case of extensive epithelioma of the orbit. When the case had first come under his care a year ago, the growth had invaded the external canthus and had pushed its way around the external wall of the orbit to the temple. He had dissected out the mass as well as he was able and had filled in the gap of denuded tissue by a pedicled flap from the temple. The case then passed from his observation until two weeks ago, when an extensive recurrence of the growth was noted, the first signs of which were said to have appeared about three months after its removal. The tissues of the outer side of the globe appeared to be involved and the eye doomed. As the patient was already blind in the other eye from an over-ripe cataract, the prognosis was bad. Before operating on the cancerous area, the removal of the cataract was accomplished. Some days later, under ether, the entire cancerous area was removed with the knife, and the subjacent tissues thoroughly treated with electrical desiccation by Dr. Wm. L. Clark. As is now evident, the result of this procedure surpassed all expectations. The entire operative area is granulating and filling in with great rapidity. Notwithstanding the advanced age of the patient, 67 years, and a condition of general arterial sclerosis, the tissues of the eye are healthy and corrected vision is normal. Dr. Posey spoke in enthusiastic terms of the remarkable results achieved in such cases by desiccation.

Operations for Contracted Socket.

Dr. Posey spoke concerning the various operations devised for the cure of contracted orbit, and referred particularly to the case of a young man whose orbit had been almost entirely obliterated as the result of a lime burn. The lower cul-de-sac, restored by the Maxwell operation, was amply deep, but there was some drawing downward of the outer half of the lower lid. Dr. Posey said that he had observed this complication in all of the cases which he had operated upon by this method, and thought that the author of the operation had directed that an unnecessarily wide area of skin be taken from beneath the lower lid. Instead of a width of 10 mm., he considered that 7 or 8 mm. suffices, and in future operations he will so modify the incision that the flap is somewhat narrowed at its temporal border. With the assistance and counsel of Dr. P. N. K. Schwenk, he had obtained a sufficiently deep upper cul-de-sac by splitting the external canthus and implanting into the upper part of the socket, previously prepared for its reception by a careful dissection of the remnant of mucous membrane present from the subjacent tissues, a long skin flap taken from the lid just below the brow. Following the recent method of Schwenk, the outer canthus was repaired, at the time of operation, by the insertion of deep sutures tied over a button. These pulled out in a few days, necessitating the repair of the gap left at the outer angle of the socket a second time.

Dr. Posey spoke of the importance of carefully stitching the flap to the edges of the denuded area. The repair of the outer angle was accomplished some weeks later, by excising a diamond-shaped area of skin from the base of the flap, union of the implanted portion of the flap having now taken place with the tissues surrounding it. A Fox conformer was kept constantly in position in the socket.

Harold W. How, M. D.,
Secretary.

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EDITORIALS.

SCIENCE VERSUS SENSATIONALISM.

"The public likes to be fooled and we give 'em what they want," said the proprietor of one of the most disreputable yellow journals in America. To serve the purpose of the sensation-monger the realm of pretended science is always open and inviting. When a scientific hoax is to be launched, the name of some alleged "great scientist," or "scientific" journal is needed to give it a start. With that provided plausible suggestion will make it go smoothly.

A really artistic bit of this kind of literature was started in the Scientific American of January 12th, 1918, has been quoted in the Literary Digest for March 3rd, and is finding its ultimate goal in the minds of credulous readers through the "patent insides" of the country papers. It is entitled "New Light Upon Our Eyes," and purports to announce the discovery, that faults of focus of the eye depend upon the abnormal action of the external ocular muscles.

The name of Dr. W. H. Bates, "discoverer of the properties of adrenalin," is used as the great authority to gain a hearing for the "story" of the enterprising writer. Then plausible suggestion is made to take the place of any statement of established fact.

There is no reason why Dr. Bates should not have credit for the priority of his observations, and the important part he took in calling the attention of the profession to the value of suprarenal extract. But such facts should not be used to camouflage the status of an hypothesis, which is essentially opposed to the great mass of evidence bearing upon it. This evidence is readily accessible to any editor who knows how to use an encyclopedia; and the statement that Dr. Bates hopes to establish his views "by a series of experiments not yet concluded" should have caused the editor of any scientific publication to look into the matter.

Another instance of false suggestion by a plausible phrase is in the allusion to "the exterior muscles of the eyeball, the function of which has long been a matter of dispute." In a way every function of the body is but partly understood, and many a point regarding it might properly be "a matter of dispute." This is true of the functions of the external ocular muscles. But some things are as well established with regard to their functions and the limitation of their actions, as any facts in physiology or physics.

The support of the retina where it will receive accurately focussed light is the dominant function of the eyeball; and it is not left to the mercy of accidental error, or bad habits in the use of the muscles of fixation. The firm resistant sclera and still more rigid cornea, and especially the thickened sclero-corneal junction, with the constantly maintained intraocular tension effectively guard the dioptric surfaces of the eye from any disturbing influence of the muscles attached to the sclera.

The eyeball is not absolutely rigid so that it could be shattered by a blow. It has enough resiliency to save it many times from destruction. Its shape can be changed by outside pressure, as that of the lid muscles, or pressure through the lids. But it is sufficiently rigid to reduce any change that can be effected in its shape by action of the external ocular muscles to an insignificant and harmless amount, completely removed from changes that perceptibly affect the distinctness of vision. The hypothesis that the focusing of the human eye was influenced to any important extent by the extra-ocular muscles was once admitted and discussed; but was completely discarded when accurate measurements of the dioptric surfaces of the eye began to be made. It will take much more than "a series of experiments not yet concluded" to revive it.

Of course this hypothesis takes its sensational value from the fact that a great many people do not like to wear glasses. Thousands that are wearing them would like to discard them, and tens of thousands who do not wear them prefer to strain their eyes rather than give the needed assistance to their focusing powers. Such people would welcome any "system" that would enable them to get along without glasses, as they would welcome any system that enabled them to live without paying for what they eat or wear. Such a system opens vast opportunities for quackery. It is not suggested that this consideration has influenced Dr. Bates in his pursuit of his idea. But the feeling that a discovery was possible that would satisfy the desire of a large number of people, might affect and partly disqualify an enthusiastic investigator for judging critically the value of his observations.

Here is where the judicial function of a scientific journal should come into play; and especially one that presents scientific discoveries of supposed value to a popular constituency, most of whom cannot judge off-hand of the value of the ideas presented to them, regarding things entirely outside their usual sphere of thought. Is it asking too much of this class of journals that all their startling novelties should be submitted to an expert for criticism, before being blazoned to the public with all the prestige the reputation of the journal can give? Such a policy would undoubtedly lessen the number of such sensational announcements, but it would help the scientific prestige of the journal. E. J.

PREVENTION OF EYE INJURIES.

After the Halifax disaster, the reports of the great number of persons blinded by it seemed almost incredible: the chances of injury to the eye in any ordinary accident were so enormously exceeded. But when we learn that previous alarms and excitement, with the glare of a fire, had drawn great numbers of persons to the windows to look out, when the great explosion came to shatter the glass and drive it inward, the excessive proportion of injuries to the eye is explained.

Eyes have been injured by fragments of glass in just this way before, but

the Halifax disaster strongly emphasizes the danger of standing close to and facing window glass in certain emergencies. Sudden explosion, wind, or missiles thrown towards glass may all produce a similar result. This danger deserves to be made the subject of popular warning, as much as the avoidance of exposure to wood alcohol or the looking at the sun during an eclipse. The danger from breaking of glasses worn is very slight compared with this. Probably in such an explosion, glasses worn on the face would be a protection rather than an added danger.

Another form of injury against which warning is particularly appropriate at the present time, is that which results from the various forms of near guns in the hands of children. From the primitive bean shooter to the elaborate air gun, the missiles from these weapons are particularly disastrous to the eye. To be struck by one of them causes so little damage to other parts of the body, that most persons overlook the danger they possess for the eye. The total force exerted is not great, and falling on most parts of the body entirely harmless. But it is concentrated; and when the eye is struck, serious injury very often results, and sympathetic ophthalmia with complete blindness is a possible outcome. The only effective method of preventing such injuries is to keep the weapons in question out of the hands of children, or to regard them always as being in the same dangerous class as the firecracker, revolver, shotgun, or rifle.

E. J.

OPHTHALMIC JOURNALS.

The ophthalmologist who reads a current ophthalmic journal published in the English language now reads a good journal. The Archives of Ophthalmology rapidly approaching the fiftieth year of its publication has always sustained a high scientific and literary standard of requirement for admission to its pages. Considering the large proportion of its matter, that was derived from German sources, it has kept up its standards remarkably well, since the outbreak of the present war cut off this source of literary supply.

The British Journal of Ophthalmology has brought together the valuable features of the three publications that combined to form it. Since the war began, many of the leading British writers on ophthalmic subjects have died. McNab, Brailey, Cant, Coats, Gowers, Doyne, Fitzgerald, Grossmann, Horsley, Walker, Jessop, Browne, Eve, Maxwell, Ogilvie, were all men who had contributed much of value to ophthalmic literature, and of whom farther valuable contributions could be expected. The British ophthalmologists who remain have had to bear their share of the terrific strain which the war has put upon the whole British medical profession; and the activity of younger men has been turned from the writing of papers. Yet in these adverse circumstances, every number of the British Journal of Ophthalmology has been of interest; and thru its pages most valuable papers are reaching our profession. With the ophthalmic resources of the British Empire back of this one publication, its future value is assured.

The only other ophthalmic journal now published in English is the American Journal of Ophthalmology. Of its value it is not necessary here to speak. It has already rendered one service in combining the heretofore scattered literary strength and resources of several publications. And it is not too much to claim that it helps to justify the opening sentence of this editorial. Beside the publications united to form this journal, two others which have heretofore been partly devoted to the literature of ophthalmology went out of existence with the close of 1917. The Journal of Ophthalmology, Otology and Laryngology, homeopathic in its antecedents, merged with the Journal of the American Institute of Homeopathy, and the Journal of Ophthalmology and Oto-Laryngology suspended publication, its editor, Willis O. Nance, adding to his valuable public

services by entering the Medical Reserve Corps of the Army.

With three entirely independent publications in the field, there will be offered the full benefits of competition for both readers and writers. But it will be healthy competition between strong journals, and on a high plane. Then there remains the competition of the general medical journals. Many papers on ophthalmic subjects, written to meet the needs of the general medical profession, ought to be published in general medical journals, rather than in those read principally by the specialist. Doubtless in these general journals, a certain proportion of papers that should be read by the specialist will continue to appear. But the substance of these will be found among our abstracts, and in the Digest of the Literature.

On the whole, the outlook for the literature of ophthalmology among English-speaking ophthalmologists is very bright. When the present war is finished in a way to render future war unnecessary, we can look forward to an era of important progress in this literature. E. J.

REPORTING OF ACCIDENTS FROM LOCAL ANESTHETICS.

The subjoined communication from the Committee on Therapeutic Research of the Council of Pharmacy and Chemistry of the American Medical Association is one which will especially interest the oculist. Probably the majority—certainly a large proportion—of our operations are performed under the influence of a local anesthetic, especially cocain, and without doubt all of us can recall cases of untoward happening, ranging from faintness to syncope. Although the communication specially requests information regarding injections of local anesthetics, it certainly cannot mean to exclude conditions following instillations into the conjunctival sac. While the pioneer is forced to come to his conclusions on the basis of a few cases, the most accurate knowledge is obtained by the collection and coordination of facts obtained from the experiences of many workers over a long time. Certainly the use of local anesthetics in Ophthalmology has been practiced long enough to permit the statement of definite facts concerning their actions. We hope that our readers will respond to the request of the committee, and on their behalf, thank them in advance.

C. L.

To the Editor:—The Committee on Therapeutic Research of the Council on Pharmacy and Chemistry of the American Medical Association has undertaken a study of the accidents following the clinical use of local anesthetics, especially those following ordinary therapeutic doses. It is hoped that this study may lead to a better understanding of the cause of such accidents, and consequently to methods of avoiding them, or, at least, of treating them successfully when they occur.

It is becoming apparent that several of the local anesthetics, if not all of those in general use, are prone to cause death or symptoms of severe poisoning in a small percentage of those cases in which the dose used has been hitherto considered quite safe.

The infrequent occurrence of these accidents and their production by relatively small doses point to a peculiar hypersensitiveness on the part of those in whom the accidents occur. The data necessary for a study of these accidents are at present wholly insufficient, especially since the symptoms described in most of the cases are quite different from those commonly observed in animals even after the administration of toxic, but not fatal, doses.

Such accidents are seldom reported in detail in the medical literature, partly because physicians and dentists fear that they may be held to blame should they report them, partly, perhaps, because they have failed to appreciate the importance of the matter from the standpoint of the protection of the public.

It is evident that a broader view should prevail, and that physicians should be informed regarding the conditions under which such accidents occur in order that they may be avoided. It is also evident that the best protec-

tion against such unjust accusations, and the best means of preventing such accidents consist in the publication of carefully detailed records when they have occurred, with the attending circumstances. These should be reported in the medical or dental journals when possible; but when, for any reason, this seems undesirable, a confidential report may be filed with Dr. R. A. Hatcher, 414 East Twenty-sixth street, New York City, who has been appointed by the Committee to collect this information.

If desired, such reports will be considered strictly confidential so far as the name of the patient and that of the medical attendant are concerned and such information will be used solely as a means of studying the problem of toxicity of this class of agents, unless permission is given to use the name.

All available facts, both public and private, should be included in these reports, but the following data are especially to be desired in those cases in which more detailed reports cannot be made:

The age, sex, and general history of the patient should be given in as great detail as possible. The state of the nervous system appears to be of especial importance. The dosage employed should be stated as accurately as possible; also the concentration of the solution employed, the site of the injection (whether intramuscular, perineural or strictly subcutaneous), and whether applied to the mouth, nose, or other part of the body. The possibility of an injection having been made into a small vein during intramuscular injection or into the gums should be considered. In such cases the action begins almost at once, that is, within a few seconds.

The previous condition of the heart and respiration should be reported if possible; and, of course, the effects of the drug on the heart and respiration, as well as the duration of the symptoms, should be recorded. If antidotes are employed, their nature and dosage should be stated, together with the character and time of appearance of the effects induced by the antidotes. It is important to state whether antidotes were administered orally, or by subcutaneous, intramuscular or intravenous injection, and the concentration in which such antidotes were used.

While such detailed information, together with any other available data, are desirable, it is not to be understood that the inability to supply such details should prevent the publication of reports of poisoning, however meager the data, so long as accuracy is observed.

The committee urges on all anesthetists, surgeons, physicians and dentists the making of such reports as a public duty; it asks that they read this appeal with especial attention to the character of observations desired.

TORALD SOLLMAN,
Chairman.

R. A. HATCHER,
Special Referee,

BOOK NOTICES.

ANATOMICAL NAMES, Especially the **Basle Nomina Anatomica (BNA)—Albert Chauncey Eycleshymer, B. S., Ph. D., M. D.,** assisted by **Daniel Martin Schoemaker, B. S., M. D.,** with Biographical Sketches, by **Roy Lee Moodie, A. B., Ph. D.,** Octavo 764 pages, illustrated by numerous wood engravings and by two full-page plates in red and black. New York City. William Wood and Company. $4.50 net.

This is almost entirely a book of reference for editors, authors, teachers, and for those physicians who aspire to purity of technical language. The author has followed the exhaustive six years' compilation of the Basle Nomina Anatomica, completed in 1894; and later published in book form in an arrangement rather difficult of orientation, as the terms were only given according to systems. So in order to facilitate the work, all the terms are arranged alphabetically with cross references to each, citing the page and serial number of the terms in their systematic positions, supplemented by 20,000 synonyms. This is the *piéce*

de résistence of the work, occupying a little over one-half of its 744 pages; the examination and following of which by medical writers is a consummation devoutly to be wished.

About 177 pages are given to 800 biographic sketches of anatomists by Roy L. Moodie of use for references. The preface of 9 pages is historic, and is interesting reading, showing the derivation of our medical terms from the Latin and Greek. The scholar may say "Dog-Latin or Bastard-Greek," for even as now accepted, Greek endings are appended to Latin roots and vice versa.

The multiplication of anatomic terms, even in this form of medical language, has grown to over 30,000, of which but one-fifth are appropriate and really needed. Each language, too, has its colloquial terms, ranging from that jaw breaker "Brustschlüsselzitzenfortsatzmuskell" of the Boche, to the Anglo-Saxon "Eye," either of which is nearly unpronounceable to a foreigner of another language. The former is better expressed in Latin by "Sternocleido-mastoideus" and the latter by "Oculus"; both of which may be sounded the same by all tongues.

Yet for short and pithy speech, we should adhere in ordinary conversation to the English word "Eye," as will the French to their almost unpronouncable "Oeil," or the German to "Kopfniker" for the neck muscle.

The anatomic association finally decided upon the principle that each part should have but a single name as simple and as characteristic as possible—and succeeded so well that the French proverb "Qui trop embrasse, mal tient," was well controverted, in that the great amount of work embraced was well done. The 30,000 odd Latin names are reduced to 4,500, more understandable, more simple and more applicable for the purpose, condensing and clearing up the numerous names to which different text books give different meanings.

Of the terms accepted for the B. N. A., possibly but a hundred have not gone or will not go into regular use; for a few long accepted, as the Zonula Zinnii, Tuba Eustachii and others, though they mean nothing except memoria to antique authors, will persist. Then, too, common usage has compelled the acceptance of thalmus opticus (sleeping room) acqueductus cerebri (which contains no water) acetabulum (vinegar cup) and other names nowadays ludicrous when translated. These are so well engrafted into all languages that they or their equivalents are parts of daily medical speech.

The work is needed by medical editors, writers and teachers and should be in all medical libraries.

H. V. W.

CORRESPONDENCE.

Records of Visual Acuity.

To the Editor: In your editorial, page 71 of January number of the JOURNAL, you quote from a communication from W. A. Abbott, Deputy Commissioner of New York Department of Labor, regarding percentage vision determination, etc. He writes that vision of 20/20 represents 100% vision and no loss. That vision of 20/30 represents 66⅔ per cent vision and 33⅓ per cent loss. That vision of 20/40 represents 50 per cent vision and 50 per cent loss. "And so on down to 20/200, which would give 90 per cent loss of vision."

I cannot understand this position as commonly accepted regarding percentage vision and percentage vision loss. The fraction 20/20 simply means that the eye sees at 20 feet what a normal eye should see at 20 feet. The fraction 20/30 simply means that the eye sees at 20 feet what it should see at 30 feet. The fraction 20/40 means that the eye sees at 20 feet what it should see at 40 feet. These fractions mean just that much and no more. Percentage means a certain portion of the whole and every like portion of the whole must mean the same amount in percentage, and if taken from the whole must reduce the whole by the same definite amount, no matter from what portion of the whole it is taken. Whether we shovel from either end of the little coal

pile or from the middle, its percentage of potentiality decreases to the same alarming extent.

The trouble with this vision percentage question is that we have been taking too seriously the fractions by which we represent acuity of vision, using them as they were never intended. Arithmetically the fraction 20/40 is half of the fraction 20/20, but the vision represented by the fraction 20/40 is not half of the vision represented by 20/20.

We must establish a definite amount of vision, and loss of vision, for every certain portion of distance between that representing normal vision and that representing blindness. Normal vision we have established at 20/20. I have suggested that blindness or total loss of vision, for industrial or insurance purposes, be established as 20/220. This still gives the afflicted laborer enough vision to get about and do many things denied him by stone blindness; or loss of the globe. We have then to proportion the whole amount of vision between that (vision) represented by 20/20 and that represented by 20/220. This can only be done by allotting 1 per cent of vision to every two feet between 0/20 and 20/220. It was on this basis that I worked out the percentage vision table which I presented before the American Academy of Ophthalmology and Oto-Laryngology at the Pittsburgh meeting last October, and known as "Chapman's Percentage Vision Table."

This of course represents percentage loss only in central acuity of vision. It does not take into consideration the many and various points of damage to an individual on account of lesions following injury to an eye. Every case presents individual problems which must be considered when the matter of compensation is being determined. As a matter of fact, however, ninety per cent of adjustments are made on the condition of central acuity of vision alone; and, made wrong at that.

Sincerely yours,

V. A. CHAPMAN, M. D.

Milwaukee, Wisconsin.

An Omission.

To the Editor: My attention has been called by John Welsh Croskey, M. D., of Philadelphia, to the fact that his name had been omitted from "The History of the Rise and Progress of Ophthalmology in Philadelphia," published in the first issue of the JOURNAL. Will you kindly insert this memorandum taken from his letter: "My Dear Dr. Risley: In 1889, I started as a note taker with the late Dr. Goodman; in 1893, I was elected Assistant Surgeon, and Surgeon in 1897, serving in that capacity until 1902 when I resigned to accept the appointment as Ophthalmic Surgeon to the Philadelphia General Hospital, which appointment I still hold."

Very sincerly yours,

SAMUEL D. RISLEY.

Philadelphia, Pa.

Blood Pressure and Intraocular Hemorrhage.

To the Editor: Anent the article by Appleman and your editorial of comment thereon in the first number of our new Americal Journal of Ophthalmology: It is my own experience that we must go one step further and investigate the condition of the circulation of these unfortunates. In the great majority of the cases that I have seen of massive hemorrhages into the vitreous, as well as little hemorrhages into the substance of the retina, the blood pressure is above normal, in some cases enormously so, as in the case of a Mrs. M., in which it was over 300 mm. systolic, my sphygmomanometer not registering higher than that. It is a matter of regret that the latter instrument is grossly neglected by ophthalmologists in diagnosis of such conditions. In the case referred to, no urinary lesion was detectable by all the well recognized tests. In other words, while tuberculin is needed in many of these cases, in addition thereto, means must be resorted to to reduce the blood pressure or to make it compensate, and thus we bring to our aid the internist, who sometimes does not give us very much aid because he does not use the

sphygmomanometer to estimate blood pressure, but he rather attempts to rely upon the condition of the pulse. Then the ophthalmologist is driven to the internal treatment of these cases, in order to at least protect the patient against recurrence at the original site or elsewhere.

Very fraternally,
GEO. F. KEIPER.

Lafayette, Ind.

[Recurring retinal hemorrhage may be accompanied by low blood pressure, as was pointed out by the late E. W. Stevens, twelve years ago (Colorado Medicine, v. 3, p. 181). Probably this association occurs in the majority of patients under middle age. Its association with variations in the coagulability of the blood should also be studied. It may occur with high coagulability, as well as with low.—Ed.]

Methylene Blue for Corneal Staining.

To the Editors Having read Captain Magruder's letter upon the use of methylene blue as a corneal stain, with great interest, I should like to mention a few points which he, because of excess of work and poor library facilities has probably overlooked. Methylene blue in 1 per cent solutions was first used as a corneal stain by von Reuss, and published by him in the Arch. f. Ophthal., vol. 78, page 297. In this article v. Reuss used the blue only as a supplementary stain for the fluorescein, thereby obtaining a double coloring. Before this, pyoktanin had been the dye. Methylene blue is purely a stromal stain and cannot take the place of fluorescein which also colors any break in the epithelial surface. If Descemet's membrane is intact, there will be no effect from the blue color. In a case report published last year in the American Medical Journal, I make mention of the fact that both fluorescein and methylene blue were used in making the diagnosis.

Truly yours,
JESSE S. WYLER.

Cincinnati, Ohio.

[Priority is a difficult and elusive thing to fix, going back as it does into history that is often very imperfectly recorded. The memorandum of von Reuss regarding methylene blue was published in February, 1911. Dr. Melville Black of Denver had called attention to the value of this drug for staining corneal ulcers in 1902, having demonstrated the staining before the Colorado Ophthalmological Society in April of that year. (Ophthalmic Record, v. 11, p. 594).—Ed.]

Ophthalmia Neonatorum Law.

To the Editor: Having received a rather large number of inquiries about the "Composite Ophthalmia Neonatorum Law" proposed by me in the January number of the JOURNAL, I here subjoin a list of all those questions, together with the answers which I have made thereto—believing that others than those who asked the questions would probably be interested.

1. In Section 2, would not "into each eye" be more specific than "into the eyes"?

Ans.—Yes. "Into the eyes" is the language of existing statutes, which, as I stated in my introduction to the proposed law, had always been retained "so far as reasonably possible." I do believe, however, that "into each eye" is the expression which ought to be employed.

2. In Section 2, Subdivision 1, "one per cent solution is vague to physicians, not specialists."

Ans.—Any family physician who does not know the meaning of "one per cent solution" should have his ignorance removed immediately at the nearest drug-store.

3. You say the prophylactic should be instilled into both eyes. Why into both?

Ans.—It is a little hard to say whether or not the correspondent is jesting. He might read footnote 2.

4. In Section 2 (and thruout your paper), is not the word "preventive" better for legislators than "prophylactic"?

Ans.—"Prophylactic" is oftener used in already existing statutes than is "preventive," and, once again, (as explained on page 43, about the middle of the second column), "so far as reasonably possible the very language now of one and

now of another section of some already existing law is made use of." I tried to make a "composite" law, rather than an absolutely new law of my own, thus forstalling charges of presumption. Moreover, "prophylactic" is a word well known to lawyers. In fact even laymen, in these days, buy and use "prophylactic" toothbrushes, "prophylactic" patent medicines, etc. However, there can be no objection to "preventive."

5. Inasmuch as our law permits the registration of births inside of a week, your law would compel the physician to do double work or else put the disease on the birth blank. Could that be managed?

Ans.—Section 5 does provide that the preventive used and the time of its use shall be stated on the birth report. There could be no double duty in the matter, save in the very rare instances when a case of ophthalmia neonatorum did actually develop. (See Section 3.) Then the very utmost haste would be necessary, and, with the vision of a child at stake, the doctor need not worry about "double duty"—the more especially as, in cases of this kind, he himself has probably failed to do his duty in the first place.

6. *"In loco parentis,"* Section 6, is Greek to most, why not say "in charge of"?

Ans.—"In charge of" is vague. *"In loco parentis"* is a well adjudicated expression—a strong point in its favor. "In the place of a parent" would have a certain advantage, of course, in that more people would understand it. There is not much choice, however, between these two latter expressions.

7. What is the object of Section 6? Would any good man cease attending a case until it was cured?

Ans.—There are various reasons why even the best of physicians must, occasionally, relinquish the treatment of a case before it is cured. The patient may remove from the doctor's "territorial jurisdiction," the doctor himself may remove, or may be discharged, etc. These events should be provided for.

8. I take issue on your footnote 4, that there is never any need of any treatment after the preventive has been used, for I have seen an instance of an attack after it had been *apparently* properly used.

Ans.—The footnote is not a portion of the proposed law. Whether right or wrong, therefore, it cannot affect the form of the proposed law. Moreover, the proposed law is so constructed so as to provide for the actual occurrence of the disease, whether as a result of negligence or in spite of the utmost care.

9. I cannot understand why the Board of Health should furnish preventives when you say that they must be *fresh*.

Ans.—The Board of Health would not send solutions, but only, in a bottle, such a quantity of the crystals of silver nitrat or of the argyrol or protargol as would make the specified strength of solution when a specified quantity of distilled water was added. I do not believe it necessary to state in the law that the Board of Health should not include the water. However, were it thought desirable, one could add after "prophylactic substances" the following parenthetic matter—(minus the water). One (or, if the Board should so choose), a dozen 1-drachm vials, each containing the proper quantity of crystals or of powder, and labeled with simple instructions, could be sent in a tiny wooden box to each and every physician in a populous state at a very small expense. This proceeding would bring the ophthalmia neonatorum law to the attention of the family doctor far more forcibly and memorably than a very large number of circulars. After one such shipment, the physician would, presumably, be able to supply the prophylactic to himself. The great and peculiar value of the shipment, however, would be its educative effect.

10. Where does the money go to carry out the provisions?

Ans.—I suppose that what is meant is not "go" but "come from." If so, I would say that the law, as proposed, declares explicitly "from the treasury of the state"—i. e., from the general fund. Some of the states already have this provision. If, however, in any of the other states, the legislature should object to the appropriation of one or two thousand dollars from the general tax fund for so extremely important a pur-

pose (which would not be likely), then some other arrangement could be made with the legislature, or, as a last resort, Sections 7 and 8 of the law could be stricken out. It should, of course, be made very clear to the legislature that the law in question would, by preventing blindness, with its consequent necessity for much free instruction of the blind, etc., save to the taxpayers of the state many times the cost of this very valuable provision of the law.

11. In Section 9 you say that copies of the Act shall be posted in all maternity homes, etc., yet, in Section 10, you say that "all reports and records made under this Act shall be kept from the public." (Substantially the same question was asked by three correspondents.)

Ans.—The Act and the reports and records which are made in pursuance thereof are not the same. There is no contradiction here at all.

12. Are not the penalties provided altogether too light?

Ans.—The Section referred to is No. 13. The penalties range from light to heavy—just as, to my thinking, they should. "Circumstances alter cases." Moreover, if penalties are extremely heavy, there is a tendency on the part of juries to return verdicts of "not guilty," whatever the evidence may have been.

I now wish to say, by way of a criticism of my own, that, in Section 2, the subdivision which is numbered "2" and the paragraph following, should run as follows:

2. Two drops of an absolutely fresh twenty-five to forty per cent solution of argyrol in distilled water.

3. Two drops of an absolutely fresh twenty-five to forty per cent solution of protargol in distilled water.

THOMAS HALL SHASTID, M. D.
Superior, Wisconsin.

BIOGRAPHIC NOTICES.

FLORENCE MAYO SCHNEIDEMAN, M. D.

PHILADELPHIA.

These include mention of ophthalmologists whose deaths occurred before the beginning of the present year, with the more important details regarding their lives that it has been possible to collect from the literature. Those whose deaths have occurred since January 1st, 1918, will be found mentioned in the department of News Items; and Biographic Sketches of those whose lives are of especial interest to ophthalmologists will be published from time to time in these pages.

ARLT, F. RITTER V., of Vienna, son of the famous von Arlt, died during the latter half of the year.

BEARDSLEY, CHARLES E., of Ottawa, Ohio, a specialist on diseases of the eye, ear, nose and throat, surgeon of the Twenty-first Ohio Volunteer Infantry, during the Civil War, died June 26th, from heart disease, aged 82.

BOCK, EMIL, born in 1857 in Galicia, and a worker for several years under Stellwag von Carion, died during the latter half of the year in Laibach, where he had settled in 1889 as an ophthalmic surgeon. He was a prolific writer and greatly interested in music and the fine arts.

BROWNE, EDGAR A., died June 27th, aged 75 years, the eldest son of Hablot K. Browne ("Phiz") who illustrated many of Dickens's earlier works, was born in London. He received his earlier education at Bruce Castle School and studied medicine at St. Thomas's Hospital. In 1864 he took the diplomas M. R. C. S. and L. M., and L. S. A. in 1865; and established himself in general practice in Liverpool.

He was soon appointed surgeon to St. George's Hospital for Skin Diseases, and assistant surgeon to the Eye and Ear Infirmary, devoting himself thereafter exclusively to eye work. In 1884 he became lecturer on ophthalmology in the University of Liverpool, a position he retained until shortly before his death. In 1907, he received from the University the degree of M. Ch. He was president of the Section of Ophthalmology of the an-

nual meeting of the British Medical Association in 1912.

Mr. Browne was the author of "How to Use the Ophthalmoscope," and (jointly) of a "Manual of School Hygiene." Most of his articles on Eye Subjects appeared in the Transactions of the Ophthalmological Society, or in the pages of the Ophthalmic Review or the Liverpool Medico-Chirurgical Journal. In 1900-2 he was president of the Liverpool Medical Institution. His artistic powers were of no mean order, and were put to good use in his lectures and demonstrations. Few had his power of rendering a dry subject attractive to his listeners. He was richly endowed with ready wit, and was a most humorous public speaker. He retired from practice in 1915.—(Brit. Jour. Ophthal. v. I., p. 589.)

CAFFEY, HUGH B., of Pittsburg, Kansas, a Fellow of the American Medical Association, and American Academy of Ophthalmology and Oto-Laryngology, First Lieutenant M. R. C., U. S. Army, died April 16th from brain tumor, shortly after operation, aged 37 years.

CAMPOS, of Cairo, Egypt, officer in the army, was killed in action October 17th, 1915.

COLEMAN, W. FRANKLIN, formerly professor of ophthalmology in the Post Graduate Medical School of Chicago, died during the first half of the year at the age of 79. He was born in Canada, and held British qualifications. He first practiced in Toronto and then in St. John, N. B., and finally went to Chicago in 1855. He wrote extensively upon electricity in eye, ear, nose and throat work, upon which subjects he published a book in 1912. He was a charter member of the Chicago Ophthalmological Society, and its President for the year 1898.

COUTO, A DA GRAÇA, Professor of Ophthalmology at the University of Rio de Janeiro and director-general of the public health service, died during the year, aged 53 years.

CRAIG, WILLIAM GIBSON, of Springfield, Mass., member of the American Ophthalmological Society, ophthalmic and aural surgeon to Mercy Hospital, Springfield, died at his home, Nov. 15th, aged 49 years.

DELENS, E., honorary surgeon of the hospitals of Paris, Professeur Agrégé in the Faculty of Medicine, died at Versailles the latter half of the year, aged 78. He early abandoned general surgery to devote himself exclusively to ophthalmology. In 1886 he was given an independent ophthalmologic service at the hospital Lariboisière, which position he retained until his retirement in 1903. He was the author, in the surgical treatise of Duplay and Reclus, of a monograph which formed a valuable summary of ocular pathology; a second edition of this work appeared in 1900.—(Archiv. d'Opht., v. 35, p. 704.)

ERB, HORACE B., of Allentown, Pa., Medico-Chirurgical College of Philadelphia, 1888, a specialist in diseases of the eye, ear, nose and throat, died at his home, Jan. 24th, from pneumonia, aged 58 years.

EVE, LT.-COL., SIR FREDERICK S., died in London, Dec. 15th. He was a general surgeon of high repute, and was once ophthalmic house surgeon to St. Bartholomew's Hospital; and from 1888 to 1889 lecturer on ophthalmic surgery at the London Hospital. He was knighted in 1911. At the time of his death, Eve was Vice-President of the Royal College of Surgeons of England.

FARNSWORTH, DEXTER BOYLSTON, of Springfield, Mo., a specialist in diseases of the eye, ear, nose and throat, died at his home Jan. 22nd, aged 67 years.

FARQUAHARSON, HENRIETTA MAY, died in Chicago, during the early part of the year, aged 54 years.

FISHER, ROY GAVIN, of Tucson, Arizona, formerly professor of ophthalmology in the Chicago Eye, Ear, Nose and Throat College, died Dec. 26, 1916, aged 33.

FORD, FRANK ALBERT, of Altoona, Pa., a specialist on diseases of the eye, died at his home, Feb. 10th, aged 40.

FRAENKEL, A., the discoverer of the pneumococcus of pneumonia, died during the latter half of 1916 at the age of 68 years.

FRANCAVIGLIA, F., the well known Sicilian ophthalmic surgeon, died during the first half of the year, from cerebral hemorrhage, aged 74 years.

FROELICH, CONRAD, died of pneumonia during the latter half of the year in Berlin, at the age of 67 years.

GOLDZIEHER, Prof., died at the age of 67, June 15, 1916. He was born at Köpcsény (Hungary), studied in Vienna and Heidelberg, in which last city he served as assistant to O. Becker. He took part in the campaign of 1870-71. He settled in Budapest in 1875, wrote the first Hungarian text book of ophthalmology (1890), and edited the Szemészeti Lapok. He was a gifted clinical observer, and was probably the first to describe the affections commonly known as "Parinaud's conjunctivitis," "Retinitis circinata," and "v. Hippel's disease."—(Brit. J. O. v. I, p. 654.)

GUILLOZ, THEODORE, born 1867, died during the latter half of 1916. He was a pupil of the distinguished French *savant* Augustin Charpentier (Y. B. v. 13, p. 418). At one time he was much occupied with questions of physiologic optics and was one of the first to obtain good photographs of the eye ground. After the discovery of the X-rays in 1896, he devoted himself to radiography; and founded, at the University of Nancy, the departments of electrotherapeutics and radiography; he was himself an early victim of the roentgen rays.—(Brit. J. O. v. I, p. 272.)

HANSON, EDWARD MATHEW, of Keokuk, Iowa, eye, ear, nose and throat surgeon to Graham Hospital, Keokuk, professor of electrotherapeutics in Keokuk Medical College of Physicians and Surgeons, who had been suffering from a nervous breakdown, died, aged 49, in St. Louis, Dec. 11th, from the effects of carbolic acid, self administered, it is believed, with suicidal intent.

HICKMAN, HERBERT VIGERS, M. B. Lond., formerly ophthalmic assistant at Guy's Hospital, died during the latter half of 1916.

HIRSCH, CAMILL, Privatdozent in Ophthalmology in Prag, who wrote on many clinical subjects, papers published in the German ophthalmic and general medical journals, died during the latter part of the year.

HOGSETT, C. G., died during the latter half of the year at Fort Worth, aged 44 years.

JESSOP, WALTER HAMILTON HYLTON, born in 1853, the son of Walter Jessop, F. R. C. S. of Cheltenham, England, died Feb. 16th, from pneumonia. He was educated at Cheltenham College, at Bedford School, and later at Gonville and Caius College, Cambridge, which he entered with a Tancred Studentship. After obtaining the B. A. degree in 1876, he entered as a student at St. Bartholomew's, becoming M. R. C. S. in 1880 and F. R. C. S. in 1884, and M. B., Cambridge, in 1886. He was ophthalmic house surgeon under Henry Power and Bowater Vernon, and took up the eye as his line of practice.

He had been elected surgeon to the Central London Ophthalmic Hospital and Ophthalmic Surgeon to the Paddington Green Hospital for children. On the retirement of Mr. Power in 1894, he was elected ophthalmic surgeon to St. Bartholomew's Hospital. As a teacher he was not fluent, but his methods were appreciated. He had a bent toward sarcasm, but could be tolerant of fools. As a writer he was not prolific, but some good work stands to his credit, notably his research into the action of cocain when it was first introduced, and his Hunterian Lectures at the Royal College of Surgeons in 1887-8 on Anatomy and Physiology of the Intraocular Muscles. His other contributions were chiefly clinical.

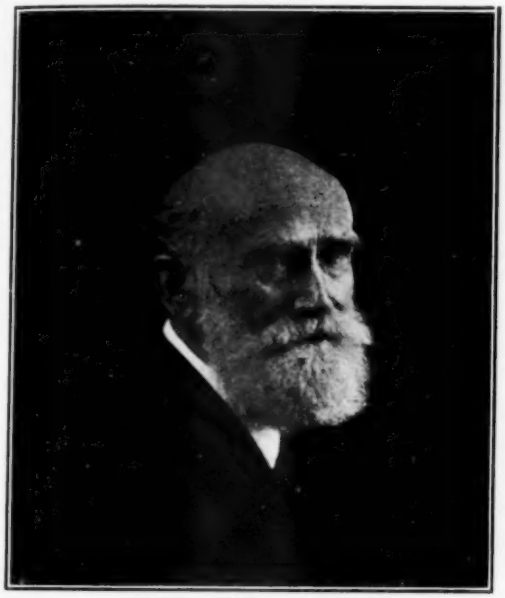
In 1915 he was elected President of the Ophthalmological Society of the United Kingdom. To him is largely due the founding of the new British Journal of Ophthalmology by amalgamation of the existing journals, namely: the Royal London Ophthalmic Hospital Reports, the Ophthalmic Review, and the Ophthalmoscope. He was appointed managing director of the new journal, living long enough to see it successfully launched. His love of art was genuine and enthusiastic; his knowledge, judgment and taste were good. On the continent he was a representative figure of British ophthalmology, being a member of most of the foreign societies of ophthalmology, of which he was a frequent attendant. He lived the free life of the country whenever he could get away from his work, and took his full share as

a country magistrate, and in other ways in the social life of his neighborhood.—(Brit. J. O. v. I, p. 213.)

KNAGGS, CAPT. F. H., R. A. M. C., Huddersfield, died during the first half of the year. On joining the R. A. M. C. he became ophthalmic and aural surgeon at the Huddersfield Infirmary and War Hospital.

KOONTZ, ALEXANDER FERGUSON, of Irvington, N. Y., since 1896 assistant surgeon to the Manhattan Eye, Ear and Throat Hospital, died in the Rockefeller Institute Hospital, March 5th, from pneumonia.

KRÜGER, Dr., of Frankfort, Germany, died during the latter half of the year.



Theodor Leber. 1840-1917.

LEBER, THEODOR, born Feb. 29, 1840, at Carlsruhe, died on April 7, 1917, at Heidelberg. In 1865 he published his first important work, dealing with the blood vessels of the human eye, the material for which he had gathered in the laboratory of Karl Ludwig in Vienna. For some years he was assistant to R. Liebreich in Paris. Leber worked with von Graefe for nearly four years; and in a very real sense may be said to have continued the life work of his master. Much of his work dealt with physiologic and pathologic problems. He was an inspiring teacher and a most acute clinical observer. His name is well known in connection with leukemic retinitis, the ocular complications of diabetes mellitus, conjunctivitis petrificans, and especially with heretitary neuritis and atrophy (Leber's disease). Abundant evidences of his clinical acumen are to be found in Leber's contributions to the Graefe-Saemisch Handbuch and *Graefe's Archiv für Ophthalmologie,* of which he was one of the editors. In 1896 he was awarded the Graefe Prize of the ophthalmological society of Heidelberg. His scientific contributions number upward of one hundred.—(Brit. J. O. v. I, p. 648.)

LIEBREICH, RICHARD, died in Paris during the early part of the year at the ripe age of 87. His name calls to mind among ophthalmologists the remembrance of a justly celebrated ophthalmoscope and his atlas of the fundus oculi. In the world of art, he was a learned and original investigator. From 1854 to 1862 he was von Graefe's principal assistant. At once recognizing the great importance of Helmholtz's invention and its clinical application, he substituted for the superposed glass plates of the great physicist, a perforated concave mirror mounted upon a convenient handle, adding correcting lenses as well as convex lenses for the inverted image. He learned to recognize and interpret the appearances till then entirely unknown, of the normal and diseased fundus, rendering the latter accessible to all in an atlas which still preserves its original value.

He knew also how to apply the discoveries of Donders, to correct scientifically the errors of refraction and accommodation as well as those of convergence, though perhaps less successful with the latter. It appears that the great master Graefe and his pupil were not always in perfect harmony. It is certain that the former did not care to have near him men of the highest order of intellect. Accordingly, upon Liebreich's announcing that he intended to leave and establish himself in Paris, von Graefe encouraged the project warmly and offered him letters of recommendation which, however, the pupil refused, somewhat to the chagrin of the master. His

success in Paris was rapid and great. He was at once consulted by the Countess of Montijo, the mother of the Empress Eugenie, who was suffering from glaucoma; a successful iridectomy saved her sight, making the fortune of the oculist. His clinic drew crowds of patients and pupils, many of whom subsequently became famous. Leber and Laquer had both been his clinical chiefs.

Upon the outbreak of the war of 1870, he left Paris for London, where he was immediately given the excellent position of oculist to St. Thomas' Hospital. Some years later, he abandoned ophthalmology for the fine arts, sculpture and painting. His ambition was not to become a Raphael or Titian, but to rediscover the pigments with which the old masters painted their masterpieces. He thought to find the explanation of the strange vagaries into which the great English painters, Turner and Mulready, had fallen in old age by optical defects, astigmatism in the one, and yellow discoloration of the crystalline lens in the other. After acquiring a competence, he finally quitted London and returned to Paris. This time he installed himself upon the other bank of the Seine, becoming the intimate of artists, to whom he became a source of inspiration.—(Archiv. d'Opht. vol. 38, p. 508.)

MANFREDI, NICOLO, born in Boscomarengo, in 1836, died September 20, 1916. He studied in Paris, where he was an assistant in the Clinic of Desmarres. Returning to Turin he worked with Reymond, Sperino and Quaglino at Pavia. Later he founded a clinic at Pisa. His contributions to the literature extended from 1864 to 1892, covering many important subjects in pathology and clinical ophthalmology. He had suffered from progressive paralysis for a year before his death.

MARSH, HOWARD, Marion Sims College of Medicine, St. Louis, 1901, a specialist on diseases of the eye, ear, nose and throat, died at his home, Russell, Kan., Jan. 3rd, aged 45 years.

MASSELON, JULIEN, born in 1844 at Rouen, where he entered upon his first medical studies, died during the first half of 1917. In 1871 he came to Paris, where he entered the clinic of de Wecker, and with this master he remained connected during his entire professional career. In 1872 he received the degree, writing his thesis upon Tobacco Amblyopia. From 1875 to 1877, he published in the Annales d'Oculistique a series of clinical lectures by de Wecker, which subsequently formed the basis of de Wecker and Masselon's Ophthalmology. In 1886 appeared his digest of Surgical Ophthalmology. In 1891 his manual of Clinical Ophthalmology in collaboration with de Wecker was published.—(Ann. d'Oculist, v. 154, p. 193.)

MAXWELL, PATRICK W., died March 10, 1917, from influenza, aged 61 years. He received his medical education at Edinburgh and Vienna, altho he practiced for many years in Dublin. He came of an old Ayrshire family. He was surgeon aurist to the Lord Lieutenant of Ireland, for his practice was not wholly confined to eye work. He was an Examiner in Ophthalmology in the Royal College of Surgeons, Ireland. Among the ophthalmic appointments held by him may be mentioned that of ophthalmic surgeon to Dr. Steeven's Hospital, to Jervis St. Hospital, and to the Royal Victoria Eye and Ear Hospital. He served as a counsellor of the Ophthalmological Society of the United Kingdom from 1900 to 1902, and from 1912 to 1915 filled the office of Vice-President. He published papers upon symblepharon, squint, accommodation and the operation of capsulotomy. One of his daughters is a member of the Ophthalmological Society of the United Kingdom, practices ophthalmology, and is at present in the service of the War Office at Malta. In 1916 she delivered the Mary Louisa Prentice Montgomery lectures.

MCCABE, EDWARD MICHAEL, Yale University, 1887, instructor in ophthalmology in his alma mater, ophthalmologist to the St. Francis Hospital Asylum, New Haven, died at his home, New Haven, Conn., June 7th, aged 53 years.

(To be continued)

NEWS ITEMS

Personals and items of interest should be sent to Dr. Melville Black, 424 Metropolitan Building, Denver, Colorado. As these columns go to press on the 30th of the month contributors should send in their items by the 25th. The following gentlemen have consented to supply the News Item Editor with the news from their respective sections: Dr. James A. Black, San Francisco; Dr. V. A. Chapman, Milwaukee; Dr. A. E. Davis, New York City; Dr. M. Feingold, New Orleans; Dr. Wm. F. Hardy, St. Louis; Dr. George F. Keiper, La Fayette, Indiana; Dr. George H. Kress, Los Angeles; Dr. W. Holbrook Lowell, Boston; Dr. G. Oram Ring, Philadelphia; Dr. Chas. P. Small, Chicago; Dr. Geo. M. Waldeck, Detroit; Dr. Oscar Wilkinson, Washington. It is desirable that this staff shall be enlarged until every city of importance in the United States shall be covered as well as all foreign countries. Volunteers are therefore needed and it is hoped that they will respond promptly to this call.

DEATHS.

Dr. Read Jennings McKay, aged 75, died at his home in Wilmington, Delaware, on March 1st.

Mr. Fergus M. Ogilvie, F. R. C. S., consulting surgeon to Oxford Eye Hospital, died January 18th, of pneumonia.

Dr. Sulzer of Paris, one of the editors of the Annales d'Oculistique, died February 9th, of angina pectoris.

Dr. Homer Warren Thompson, aged 58, of Salem, Ohio, died at his home February 21st.

Edward A. Trommald, of Los Angeles and Long Beach, California, died on February 17th after a surgical operation.

Dr. Charles Smith Turnbull, of Philadelphia, died at his home, February 21st.

CORRECTIONS.

In the discussion of Dr. A. W. Mason's paper on The Ophthalmoscope, Retinoscope and Pupillary Disc in Refraction, page 129 of the American Journal of Ophthalmology he is quoted as saying "I took ten cases and refracted them." This should read "I took one hundred cases and refracted them with the results reported in the Ophthalmic Record, 1912."

In the discussion of Dr. M. M. Cullom's paper on "Removal of Tonsils for Recurrent Iritis" in the American Journal of Ophthalmology, February, page 136, the discussion credited to Dr. Eulaney, Madison, properly belongs to Dr. O. Dulaney, Dyersberg, Tennessee.

PERSONALS.

At a recent meeting of the Galveston County Medical Society Dr. Henry C. Haden was elected president.

The practice of the late Dr. Homer W. Thompson, of Salem, Ohio, is offered for sale.

Dr. Austin A. Hayden, of Chicago, has been confined to St. Joseph's Hospital, with an attack of acute nephritis.

Dr. Francis Lane, of Chicago, is convalescing from an acute illness; he was in St. Luke's Hospital for a week.

Dr. Brown Pusey, of Chicago, is in St. Luke's Hospital, making a satisfactory recovery after a recent gall-bladder operation.

Dr. A. M. Hall, of Chicago, has been appointed a member of one of the local medical advisory boards.

Doctor Chas. E. Hammett, of Washington, D. C., has recently been appointed Clinical Professor of Ophthalmology in Georgetown University.

Dr. Gourfein has been appointed successor to the late Professor Haltenhoff, of Geneva.—(British Jour. Ophthal.)

Dr. L. C. Peter of Philadelphia has been appointed to succeed the late Wendell Reber as Professor of Ophthalmology in Temple University.

Professor St. Bernheimer, of Innsbruck, has been nominated to succeed Professor Ernest Fuchs, in Vienna. Fuchs (who is in good health) will devote his leisure to research work.—(British Jour. Ophthal.)

Lieut.-Col. R. H. Elliot, I. M. S., (retired), has been elected a member of the Council of the British Medical Association, to represent the Indian Medical Service, and Chairman of the Naval and Military Committee of the Association.—(British Jour. Ophthal.)

The scientific societies of Cuba recently presented a gold medal to Dr. Juan Santos Fernandez, of Havana, on the occasion of his seventieth birthday. The Academia de Ciencias, of which he was president, devoted a special meeting to the ceremony of presentation.

COMING MEETINGS.

Ophthalmological Society of the United Kingdom, London, May 2-4.

Société d'Ophtalmologie de Paris, May 6th, Paris, 51 Rue de Clichy.

Section on Ophthalmology, American Medical Association, Chicago, June 11-14.

American Ophthalmological Society, Eastern Point, New London, Conn., July 9, 10.

Oxford Ophthalmological Congress, Oxford, England, July 10-12.

American Academy Ophthalmology and Oto-Laryngology, with the Fourth Colorado Ophthalmological Congress, Denver, Colo., August 6, 7, 8.

Pacific Coast Oto-Ophthalmological Society, Salt Lake City, Utah, August 12, 13.

SOCIETIES.

At the mid-year meeting of the Eye, Ear, Nose and Throat Section of the Indiana State Medical Association, held in Indianapolis, March 6th and 7th, the members of the Section voted to organize "The Indiana Academy of Ophthalmology and Oto-Laryngology." The organization of this special society fills a long felt want and it is the hope of the officers of the Indiana Academy to ultimately hold monthly or bi-monthly meetings. The officers of the Academy are Dr. John R. Newcomb, president; Dr. Wm. S. Tomlinson, vice-president; Dr. E. M. Shanklin, secretary-treasurer.

The program of the March 6th meeting of the Chicago Medical Society was a symposium on medical problems connected with the draft. Major Wm. H. Wilder gave an interesting paper on the subject, from the standpoint of the ophthalmologist. He called particular attention to the care which must be exercised to detect malingerers. At Camp Taylor, where Major Wilder was on duty, a man had been qualified by his local examiner, but when examined at the Camp was found to have a glass eye. Three drafted men who were anxious to evade duty, were detected rubbing foreign matter into their eyes for the purpose of inducing inflammatory conditions which might be taken for trachoma. These three men, after being caught at it, were court-martialed, dismissed from the army, and sentenced to hard labor in prison, for three years.

MILITARY NOTES.

Major George E. de Schweinitz, after more than four months' service in France, has returned to this country.

Capt. F. E. Woodruff, of St. Louis, has been transferred from the Aviation Camp at Mt. Clemens, Michigan, to Camp Wadsworth, Spartansburg, S. C.

Capt. James G. Calhoun, of St. Louis, has been ordered to Camp Funston to report for duty April 5th.

Dr. George F. Keiper, a colleague, who is serving as President of the Board of Education in La Fayette, Indiana, is also a member of the medical advisory board for his county.

Capt. Francis Lane has been transferred from the aviation examining unit in Chicago to the ophthalmologic department, base hospital, at Camp Grant, Rockford, Illinois.

Dr. Willis O. Nance, of Chicago, has entered the Medical Reserve Corps of the United States Army.

Major Gustavus I. Hogue is now in charge of the Eye Department, Base Hospital, Camp McClellan, Anniston, Alabama.

A dispatch from Havre reports that Dr. de Mets, a prominent Antwerp oculist, was shot by the Germans a short time ago.

Capt. W. F. Patten, of Washington, D. C., is Attending Surgeon Aviation Service, Episcopal Eye, Ear and Throat Hospital.

Capt. W. H. Huntington, of Washington, D. C., is stationed at the Walter Reed Hospital.

The Legion of Honor has been conferred on Dr. Louis Borsch, formerly of Philadelphia, in recognition of his services as eye surgeon at the French Military Hospital of Grand Papais in the Champs Elysees. The presentation was made by President Poincaré. In August, 1909, Dr. Borsch received the Royal Medal of the Italian Ministry of Public Instruction for his work in Ophthalmology.

According to recent news dispatches men in training at the Aviation School at North Island, near San Diego, have been ordered to turn in or destroy all goggles made by a certain firm. Some of the aviation students, among them Major John Purroy Mitchell, former Mayor of New York City, have reported that it was impossible to judge accurately of altitude and make a good landing while wearing these goggles; but that the difficulty disappeared as soon as the goggles were removed. The subject is under official investigation.

MISCELLANEOUS.

The British Ophthalmic Hospital at Jerusalem, used by the Truks as an ammunition storehouse, was partly destroyed when they hastily evacuated the city. This hospital has been of immense benefit, not only to the residents of Jerusalem of all classes, but also to patients drawn from every part of Palestine.

Plans have been inaugurated for a campaign to raise $25,000 for the South Baltimore Eye, Ear and Throat Hospital. The money raised will be used to enlarge the hospital and convert it into a general hospital.

"Collosol" Cocain is a new product made by the Crookes Laboratories, London, who claim that it retains its anesthetic action and loses its general toxicity. A recent contention has arisen over the product in which the claims of the makers are disputed.

OPHTHALMIC LITERATURE.

Under this head continuing the "Index of Opthalmology" heretofore published in **Ophthalmic Literature** will be found the subjects of all published papers received during the last month, that bear to an important extent upon ophthalmology. The subject is indicated rather than the exact title given by the author. Where the original title has been in a foreign language it is translated into English. The journal in which the paper is published will indicate the language of the original.

The names of the different journals are indicated by abbreviations which generally correspond to those used by the **Index Medicus**, the **Journal of the American Medical Association**, and the **British Journal of Ophthalmology**. We will from time to time publish the list of ophthalmic journals, with the abbreviations used for each. Often a single letter discriminates between journals published in different languages. Thus "Arch. of Ophth." refers to the Archives of Ophthalmology, published in English; "Arch. d'Opht.," indicates the French Archives d'Ophtalmologie; "Arch. de Oftal." refers to the Archivos de Oftalmologia Hispano-Americanos, while "Arch. di Ottal." indicates the Italian Archivio di Ottalmologia.

In this index of the literature the different subjects are grouped under appropriate heads; so that all papers bearing on the same, or closely related subjects, will be found in one group. The succession of the groups is the same from month to month, and identical with that of the Digest of the Literature. Where a paper clearly refers to two subjects that belong in different groups, it will be noticed in both groups.

Each reference begins with the name of the author in heavyface type. This is followed by the subject of his paper. Then in brackets a number with (ill.) indicates the number of illustrations, or a number with (pl.) the number of plates illustrating the article, (col. pl.) indicates colored plates. (Abst.) shows that it is an abstract of the original article. (Bibl.) tells that the paper is accompanied by an important bibliography. (Dis.) means that the paper was read before some society and gave rise to a discussion which is published with it.

The "repeated titles" may render accessible the essential part of a paper, the original of which could not be consulted. These give (in brackets) after the author's name the volume and page of this department of "Ophthalmic Literature" where the title of the paper will be found; and then the journal, volume, and page where the translation or abstract is published.

It is desired to notice every paper as soon as possible after it is published. Readers will confer a favor by sending titles they notice have been omitted, with journal and page of publication; and of their own papers, sending either a copy of the journal in which each appeared, or a reprint. These should be sent as soon as possible to 318 Majestic Building, Denver, Colorado.

METHODS OF DIAGNOSIS.

Elliot, R. H. A Scotometer. Brit. Jour. of Ophth., v. 2, p. 168.

Wolfe, C. T. The Eye as Index of Certain Diseases. Kentucky Med. Jour., v. 16, p. 110.

THERAPEUTICS.

Basterra y Santa Cruz. Ethylhydrocuprein in Ophthalmology. Arch. de Oftal. Hispano-Amer., v. 17, p. 670.

MacWhinnie, A. M. Subconjunctival Injections. New York Med. Jour., v. 107, p. 343.

OPERATIONS.

Elschnig, A. Prevention of Postoperative Infections. Graefe's Arch. f. Ophth., May, 1915. Brit. Jour. Ophth., v. 2, p. 183.

REFRACTION.

Cause and Prevention of Myopia. Lancet, Feb. 9, 1918, p. 240.

Champlin, H. W. Fitting of Glasses by the General Practitioner. Shall he do it? Med. Summary, v. 39, p. 359.

Des Voeux, H. A. Eye Strain and the General Practitioner. Abst. Brit. Med. Jour., Feb. 16, p. 205.

Dunn, J. Headache the Result of Eye Strain. Arch. of Ophth., v. 47, p. 146.

Green, J., Jr. Spectacles. Ref. Handb. Med. Sc., 1917, v. 8, p. 634.

Krebs, A. Myopia with Marked Choroidal Degeneration. Penn. Med. Jour., v. 21, p. 341.

Mason, A. H. Ophthalmoscope, Retinoscope and Pupillary Disc in Refraction. Abst. Amer. Jour. Ophth., v. 1, p. 129.

Masuda, J. Myopia Statistics in Japan. China Med. Jour., 1917, v. 31, p. 348.

Minturn, R. Points in Static Skiametry. Optical Jour. and Rev. of Optom., v. 40, p. 273.

Wilson, J. A. Cause and Prevention of Myopia. Lancet, Feb. 16, p. 277.

OCULAR MOVEMENTS.

Guthrie, A. L. Diagnostic Value of Nystagmus. Jour. Oklahoma State Med. Assn., v. 11, p. 91.

Mann, R. H. T. Early Correction of Squint. Jour. Arkansas Med. Soc., v. 14, p. 183.

Tyson, H. H. Traumatic Paralysis of Left Abducens Nerve. Arch. of Ophth., v. 47, p. 204.

CONJUNCTIVA.

Brav, A. Treatment of Trachoma. Med. Rev. of Rev., v. 24, p. 149.

Heckel, E. B. Iced Normal Salt Solution in Gonorrheal Conjunctivitis. Penn. Med. Jour., v. 21, p. 337.

Herron, J. T. Treatment of Purulent Conjunctivitis. Jour. Tenn. State Med. Assn., v. 10, p. 445.

Kirk, J. Trachoma in the Straits Settlements. Brit. Jour. Ophth., v. 2, p. 135.

McDaniel, F. L. Trachoma. Jour. Kans. Med. Soc., Feb., 1918, p. 61.

Mas and Magro. Morphology of Trachoma Bodies. Siglo Med., v. 64, p. 964.

Morax, V. Parinaud's Conjunctivitis. Brit. Jour. Ophth., v. 2, p. 133.

Stark, H. H. Membranous Conjunctivitis of Over Four Years' Duration. (Dis. Bibl.) Amer. Jour. Ophth., v. 1, p. 91.

Strickler, D. A. Traumatic or Infectious Conjunctivitis. Colo. Ophth. Soc., Dec., 1917. Amer. Jour. Ophth., v. 1, p. 143.

CORNEA AND SCLERA.

Bonnefon. Corneal Grafts. Lyon Chirurg., v. 14, p. 903. Jour. Amer. Med. Assn., v. 70, p. 576.

Bruder, J. Keratitis Profunda. Arch. of Ophth., v. 47, p. 201.

Coulter, R. J. Binocular Keratitis after Uniocular Injury. Brit. Jour. Ophth., v. 2, p. 139.

Green, J., Jr. Thermophor in Treatment of Pneumococcus Ulcer of Cornea. Southern Med. Jour., v. 11, p. 251. Abst. Amer. Jour. Ophth., v. 1, p. 135.

Irwin, F. N. Scleritis; Possible Tuberculous Origin. Arch. of Ophth., v. 47, p. 208.

Key, B. W. Extensive Ciliary Staphyloma. Arch. of Ophth., v. 47, p. 205.

Knapp, A. Corneal Suppuration in Exophthalmic Goiter. Arch. of Ophth., v. 47, p. 173.

McCaw, J. A. Sclero-corneal Tuberculosis. Colo. Ophth. Soc., Dec., 1917. Amer. Jour. Ophth., v. 1, p. 140.

Magruder, A. C. Staining Corneal Ulcers. Amer. Jour. Ophth., v. 1, p. 152.

Renninger, A. R. Corneal Ulcers. Penn. Med. Jour., v. 21, p. 296.

Zentmayer, W. Disciform Keratitis. Wills Hosp. Ophth. Soc., Dec., 1917. Penn. Med. Jour., v. 21, p. 341.

Repeated Titles. **Santos Fernandez** (v 1, p. 78). Jour. Amer. Med. Assn., v. 70, p. 740.

UVEAL TRACT.

Argañaraz, R. Gyrate Atrophy of Choroid and Retina. (1 col. pl., 2 ill.) Arch. de Oftal., Hisp.-Amer., v. 17, p. 665.

Bell, G. H. Plastic Iritis. Arch. of Ophth., v. 47, p. 209.

Cullom, M. M. Removal of Tonsils for Recurrent Iritis. Tr. Sec. on Ophth., South. Med. Assn., Nov., 1917. Abst. Amer. Jour. Ophth., v. 1, p. 136.

Hillegas, W. H. Iritis. Hahnem. Mo., v. 53, p. 13.

Hubbard, S. J. Kerato-iritis. Arch. of Ophth., v. 47, p. 210.

Jackson, E. Causes of Iritis and Allied Inflammations. (Dis.) Colo. Med., v. 15, p. 63.

Libby, G. F. Traumatic Choroiditis and Probable Vitreous Hemorrhage. Colo. Ophth. Soc., Dec., 1917. Amer. Jour. Ophth., v. 1, p. 143.

Steinbugler, W. F. C. Dental Infection in Eye Diseases. (Bibl.) Arch. of Ophth., v. 47, p. 182.

Stieren, E. Iridocyclitis in Antrum Disease. Penn. Med. Jour., v. 12, p. 341.

Woods, A. C. Antigenic Properties of Uveal Tissue Shown by Complement Fixation. Arch. of Ophth., v. 46, p. 503. Abst. Amer. Jour. Ophth., v. 1, p. 126.
Experimental Iridocyclitis (2 pl., 3 Fig. Bibl.). Arch. of Ophth., v. 47, p. 161.

GLAUCOMA.

Allport, F. Iridotasis in Glaucoma. Ill. Med. Jour., v. 33, p. 155. Med. Rev. of Rev., v. 24, p. 144.

Bailliart, M. P. Arterial and Intraocular Pressure. Annales de Méd., v. 4, May-June, 1917, p. 328.

Carr, A. M. Normal Intraocular Tension not Lowered by Narrowing of Pupil. Arch. of Ophth., v. 47, p. 177.

Claiborne, J. H. Iridectomy for Glaucoma. Arch. of Ophth., v. 47, p. 206.

Clapp, C. A. Corneo-scleral Trephining. Amer. Jour. Ophth., v. 1, p. 94.

Gifford, H. Glaucoma from Absorption of Senile Cataract. (Dis.) Amer. Jour. Ophth., v. 1, p. 83.

Markel, J. C. Glaucoma. Penn. Med. Jour., v. 21, p. 341.

Posey, W. C. Indications for Operation in Glaucoma. (Dis.) Penn. Med. Jour., v. 21, p. 290.

Repeated Titles. **Feingold** (v. 1, p. 220). Amer. Jour. Ophth., v. 1, p. 132.

CRYSTALLINE LENS.

Black, M. Results 26 Years After Cataract Operation. Colo. Ophth. Soc., Dec., 1917. Amer. Jour. Ophth., v. 1, p. 142.

Fisher, J. H. Atropin in Cataract Extraction. Brit. Jour. Ophth., v. 2, p. 186.

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